DOANE AGRICULTURAL DIGEST

UNITED STATES

DOANE AGRICULTURAL SERVICE INC.
MANAGEMENT, APPRAISAL, RESEARCH AND CONSULTATION
ST. LOUIS, MO.

DOANE FARM-TESTED BUILDING PLANS

CUT BUILDING COSTS

Often More Than Half

Thirty years of managing thousands of farms has taught us the kind of buildings that crops and livestock can pay for.

YOU SAVE FOUR WAYS

1—CUT LABOR COSTS OF CONSTRUCTION

Time is saved by reducing sawing, notching, framing, and double construction. Labor costs can often be cut in half.

2—REDUCE MATERIAL COSTS

New methods of construction often cut lumber costs in half. Every piece does a job—or two.

3—USE FARM LABOR

Any man who can build a fence or gate can build Doane-simplified farm buildings by following easy-to-read plans.

4—CUT DAILY WORK DURING LIFE OF BUILDING

Doane buildings dovetail into Farm Management plans. They are designed to save "chore labor" in feeding, milking, bedding, and manure removal. Labor is also cut in moving feed and bedding into storage. These savings continue throughout the life of the building—they amount to many times the cost of the building.

Doane farm buildings work, function, perform, and do things—like your tractor in your field. They are more than mere shelter and storage. They reduce or eliminate walking, climbing, lifting, pulling, pushing, scooping, forking, hauling, and hard work.

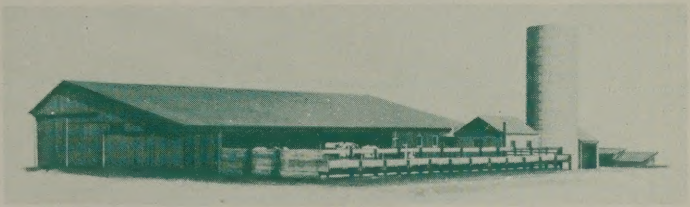
DOANE BUILDINGS ARE TOOLS

THE DOANE SEAL OF APPROVAL ON A PLAN MEANS:

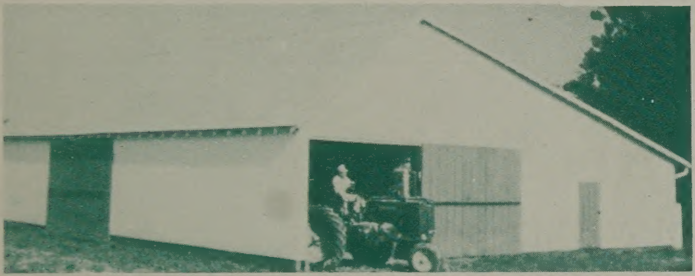
FARM TESTED	—Built on farms and thoroughly tested under actual farm use.
LOW-COST	—for material, for construction labor, for unit of use.
HIGH IN USE VALUE	—a tool that does more work easier and quicker.
APPROVED	—and recommended by Doane Agricultural Service, Inc.

Plan B-3 — DOANE LOW-COST POLE FRAME BARN — $5.00

Designed for work simplification in handling dairy and beef cattle. Hay and bedding stored where used. Can build for **half the cost** of conventional construction. Barn, 52x52 ft. requires only 6,789 bd. ft. of lumber (compared to 19,800 for conventional), and 250 to 350 man hours for construction. No notching—little sawing—reduces labor. Permits use of farm help in construction. Capacity, (52 ft. length), 14 to 17 milk cows, 40 to 50 beef cows, or 100 calves. Hay and straw capacity 90 tons baled or chopped. Length can be varied in multiples of 13 ft.

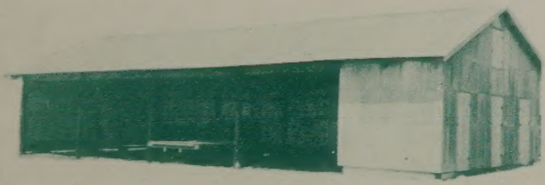


As a Labor-Saving Dairy Loafing Barn



As a Low-Cost Beef-Cattle Barn

Plan B-9 — DOANE LOW-COST ALL-PURPOSE SHED — $2.00



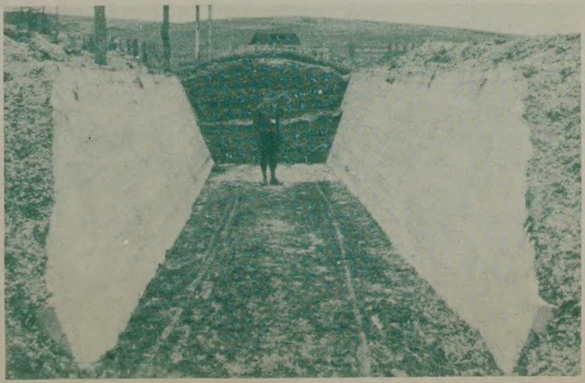
Fits Any Farm

Doane's lowest cost structure combining pole frame, simple truss and purlin roof. Eliminates two-thirds lumber in roof alone. Used as shelter for beef cattle, young stock, dry cows, sheep; as a loafing barn; an implement shed; or storage for feed, bedding, fertilizer, seed and supplies. 26x52 ft. requires 3,200 bd. ft. lumber. It is expansible in 13 ft. lengths. By leaving two back sections and one end open, 580 bd. ft. of lumber can be saved. Picture shows use as machine shed with grain bins.

Plan C-6

DOANE CONCRETE TRENCH SILO — $2.00

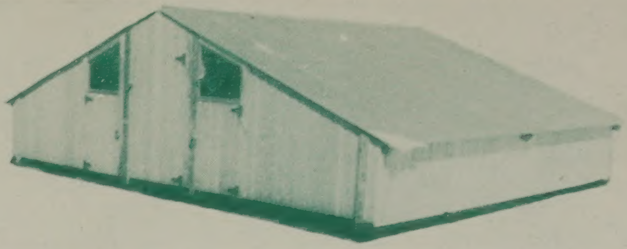
Easy to fill—no climbing each day in feeding. Filled by driving straight through over ensilage—sawdust topping will prevent spoilage—mud-free. Trench silo can be built for about half the cost of an upright silo. 12 ft. wide, multiples of 16 ft. in length. Capacity 35 tons per 16 ft. section. Each 16 ft. section requires 43 sacks cement, 4¾ cu. yds. sand, 7½ cu. yds of gravel and 570 ft. of reinforcing rod. Plans include feed bunk, fence, and suggested arrangements.



Half the Cost of Upright Silo

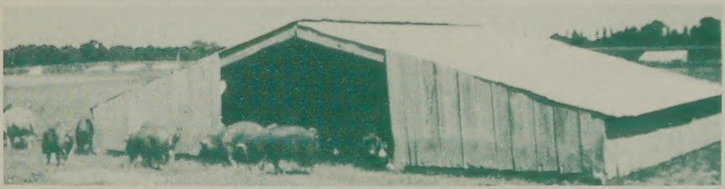
Plan H-1 — DOANE PORTABLE 2-SECTION 4-SOW HOG HOUSE — $3.00

Provides year-round use—farrowing house for sows and pigs—shade and shelter on clean pasture—and shelter for fattening hogs. Size 16x19 ft., yet portable through 12 ft. gate—they separate at the ridge into two sections. Has 1,519 bd. ft. lumber (1,008 without floor). One-third **less lumber than conventional construction.**



Combines Advantages of Central Farrowing House and Portable Units

Plan H-4 — DOANE PORTABLE 2-SECTION HOG SHELTER — $3.00.



For Additional Shade and Shelter

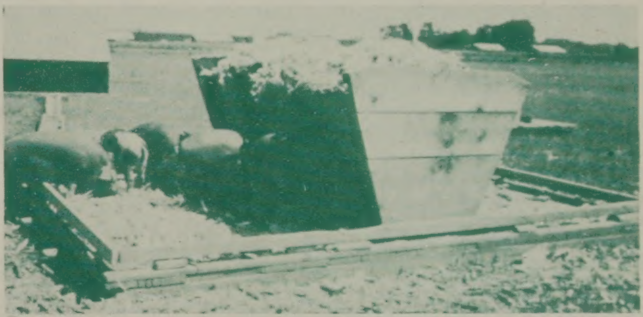
Shelter for sows, shoats, and fattening hogs —portable through 12 ft. gate. Size 20x30 ft. (2 sections together). Only 1,125 bd. ft. lumber. Our lowest-cost portable unit.

Plan E-2

DOANE PORTABLE EAR CORN FEEDER

$2.50

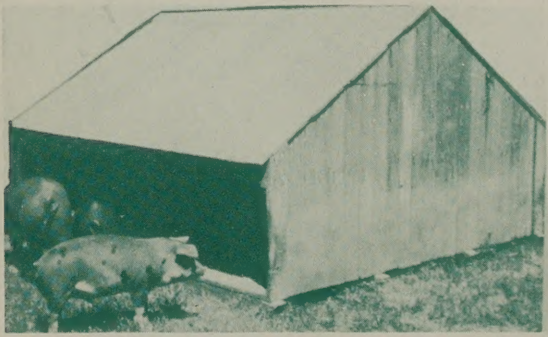
Self-feeder—60 bu. capacity. Feeds hogs on platform out of mud. Cobs rooted off platform through crack in railing. Feeds 100 to 150 hogs. Has 711 bd. ft. lumber. Great labor-saver.



Let the Hogs Do the Work

Plan H-10

DOANE PORTABLE HOG SELF-FEEDER, 100 BUSHEL CAPACITY — $1.00



A Hog Feeder That Works

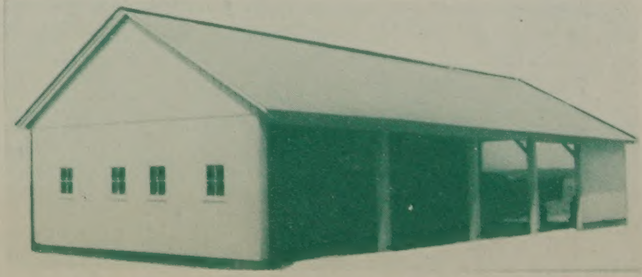
For feeding supplement. Excellent for use with Doane Portable Ear-Corn Feeder. Will also handle ground feed or shelled corn. Partitions may be used. Works with minimum attention and **no adjusting.** Designed so feed is controlled by the hogs without waste. Easy to fill. Can be built on farm with 900 bd. ft. lumber and 30 hrs. labor.

Plan M-5

DOANE POLE FRAME MACHINE SHED

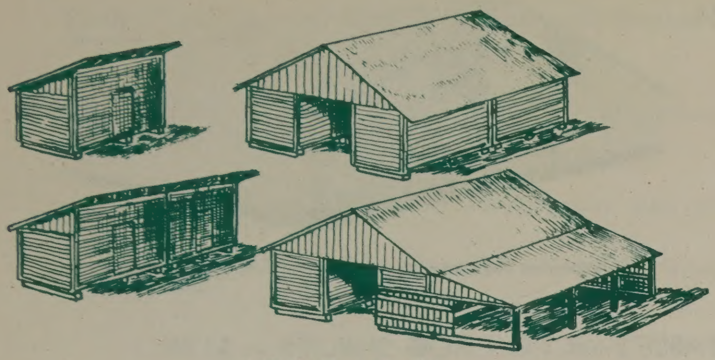
$5.00

For sheltering, repairing, and servicing farm equipment. Doors 14 and 16 ft. in width and 10 and 13½ ft. in height. Size 26x86 ft. requires 6,749 bd. ft. of lumber. Length can be varied in multiples of 14 ft.



Door Clearance For Modern Machinery

Plan C-7 — DOANE EXPANSIBLE CRIB — $3.00



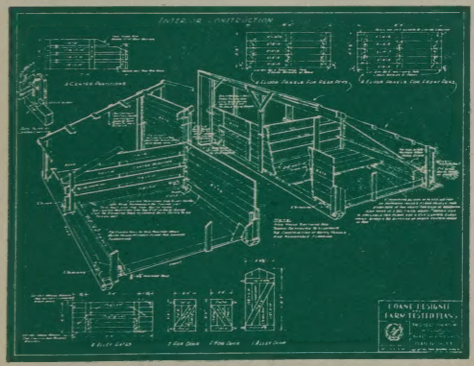
A Crib That Can Grow

Built as a single or double crib or complete with feeding shed for 20 to 40 head of cattle. The 32 ft. double crib provides storage for 1,500 bu. ear corn, 650 bu. small grain, and includes a grinding room. Corn and grain flow partially by gravity into the grinder, are ground and then blown into the self feeder. 3,042 bd. ft. lumber are required for a single crib 8x32 ft. 6,737 bd. ft. are required for the double crib. This does not include lumber for small grain bins or feeding shed. Cross piers save 40 percent of concrete.

R-8 — DOANE RIGID PILLAR HOUSE — $5.00

New simplified construction saves one-fourth the cost of building this farm home. Half of the house is for living. It consists of living room, two bedrooms, bath and kitchen. The other half is for work. It contains a large "kitchshop" for laundry, food processing and storage; a large garage-workshop for storage and repair of automobile, truck, and farm equipment. It provides a place to feed large crews in summer. The house also contains an office and cleanup room. Overall size 32x72 ft., all on one floor.

A Farm Home That Reduces Work



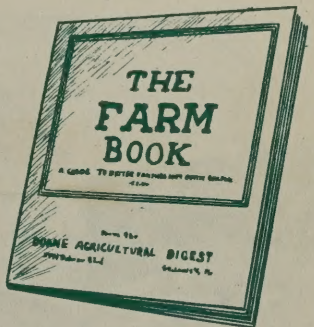
Easy-Read Plans Make Building Simple

READ-EASY PLANS

A new method of drawing plans clearly shows the position and dimension of each piece of material. Plans are easy to follow for men not accustomed to reading blueprints. With each plan is a list of material and full instructions for building. For pole construction, a list of places where treated poles can be obtained is included.

THE FARM (building) BOOK — $1.15

A 96-page paper-covered book profusely illustrated. The only book on farm buildings written by a farm management organization. It tells how much livestock can pay for buildings, and covers the many factors on arrangement, work simplification, and planning necessary to get the right buildings at low cost.



How to Make Buildings
Money-Making Tools

Write for the FREE Farm Building Plan Catalogue giving detailed descriptions of buildings and plans.

DOANE AGRICULTURAL SERVICE, INC.
5144 DELMAR BLVD. ST. LOUIS 8, MO.

ORDER YOUR PLANS NOW TO SAVE TIME AND MONEY
... IN CONSTRUCTION ... IN USE

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DOANE AGRICULTURAL DIGEST

UNITED STATES

A Digest Service with two primary objectives:

1. To record and keep up-to-date pertinent agricultural facts, and state and national statistics.
2. To analyze, interpret and record currently the agricultural situation and outlook.

DOANE AGRICULTURAL SERVICE, INC.
MANAGEMENT, APPRAISAL, RESEARCH AND CONSULTATION
5144 DELMAR BOULEVARD ST. LOUIS 8, MISSOURI

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INTRODUCTION

DOANE AGRICULTURAL DIGEST **is designed for PRACTICAL use.**

FARMERS—The man on the farm finds it increasingly helpful in making a success of the business of farming. When used regularly, it **increases profits** and **reduces losses.**

LANDOWNERS—The DIGEST provides a ready guide for keeping up to date on agriculture. Its use insures better management of land investments.

EXECUTIVES and **MANAGERS**—Industries directly or indirectly affected by agriculture make profitable use of the DIGEST. It discusses important agricultural developments and suggests what business should be doing about them.

ADVISERS and **SPEAKERS**—The DIGEST is extensively used as an authoritative agricultural reference.

STRENGTH OF THE DIGEST stems from the work of the Doane staff which is actually engaged in:

FARM MANAGEMENT—Farms operated for profit in the principal agricultural areas of the United States.

APPRAISING—Valuation of farm land, crops, livestock and equipment for individuals and institutions.

INDUSTRIAL and **FINANCIAL PLANNING**—A great variety of work for commercial organizations on any activity related to agriculture.

RESEARCH and **SPECIAL STUDIES**—Reports, books, and articles on numerous phases of agriculture.

EDITING THE DIGEST—True D. Morse, President of Doane Agricultural Service, Inc., is Editor. All members of the management, appraisal and research staff, long experienced in agriculture, make important contributions.

GROWTH OF THE DIGEST—Your questions, suggestions, and criticisms will help make DOANE AGRICULTURAL DIGEST grow increasingly useful. Feel free to write us at any time. Your comments enable us to give you, who use the Digest, maximum SERVICE.

DOANE AGRICULTURAL SERVICE, INC.
5579 Pershing Ave.
St. Louis 12, Mo.

Doane Agricultural Service, Inc.
Founded 1919

Doane Agricultural Digest
Established 1938

PREFACE

(As issued when the DOANE AGRICULTURAL DIGEST was established in July, 1938)

The DOANE AGRICULTURAL DIGEST is a combination of current analysis and permanent reference data. It treats all aspects of agriculture and its effect on business and investments. It is a continuous service that should grow in value as this binder fills with vital agricultural information. Classified, indexed, standardized, graphically and briefly presented, it should become the reference source for the farm facts required by business executives, farm owners, operators, and managers, appraisers, fieldmen, and others who need the end-product without the burden of detail.

The most pertinent and accurate facts will constantly be gleaned from hundreds of sources. The labors of agricultural colleges, statistical and research bureaus, and various governmental and other agencies will be placed in usable, readable form for business men who are constantly called upon for practical answers to an endless succession of pressing business problems.

New data will constantly be built into this DIGEST as rapidly as such information is released. Old data will be revised as rapidly as more accurate and up-to-date figures become available.

The Doane Agricultural Service has had the temerity to undertake the production of an agricultural digest because it has for years been making various statistical studies and analyses for some of the leading business firms of this country.

Such studies, in many respects paralleling this type of information, have been made for specific companies at large expense. If it has justified this major expenditure by individual companies, these data and interpretations should be of definite service to innumerable people when made available at a nominal cost.

The Doane Agricultural Service manages over 300,000 acres of farm land located in 18 midwestern and southern states. Land appraisals and special reports on a wide variety of agricultural problems have been made in many other states.

This work carries the organization's representatives into practically every type of agricultural region in the country and gives an intimate knowledge of all major agricultural enterprises.

The Editor, True D. Morse, has been with the Doane Agricultural Service for more than 13 years. Prior to that he was an economist with the Missouri College of Agriculture. He has worked in all of the territory serviced by the organization, has traveled in all the states of the Union and in the neighboring countries. His professional articles and lectures have brought him recognition.

This broad background enables the intelligent selection of what is the most meaningful and vital agricultural information, and even more important, gives a practical background for the interpretation of this information.

Many skilled research men develop important statistics which they are unable to effectively interpret and give practical application. The actual management and appraisal of farms in the field on one hand and the constant contact with business men and business organizations on the other gives a unique combination of knowledge and experience which when reflected through the DOANE AGRICULTURAL DIGEST will give it a vitality and effectiveness that could not otherwise be obtained.

The farm managers and appraisers of the Doane Agricultural Service are graduates of agricultural colleges and universities, and many have served on the staffs of such institutions prior to joining the Doane Agricultural Service.

We invite criticisms and suggestions to the end that the DOANE AGRICULTURAL DIGEST may be constantly built to a higher standard.

We want the DIGEST to be another DOANE "Service" that by merit will attain a position that will enable it to definitely contribute to a better understanding of agriculture and its relationship to all business, and the welfare and general prosperity of all people.

July 1938

DOANE AGRICULTURAL SERVICE

D Howard Doane

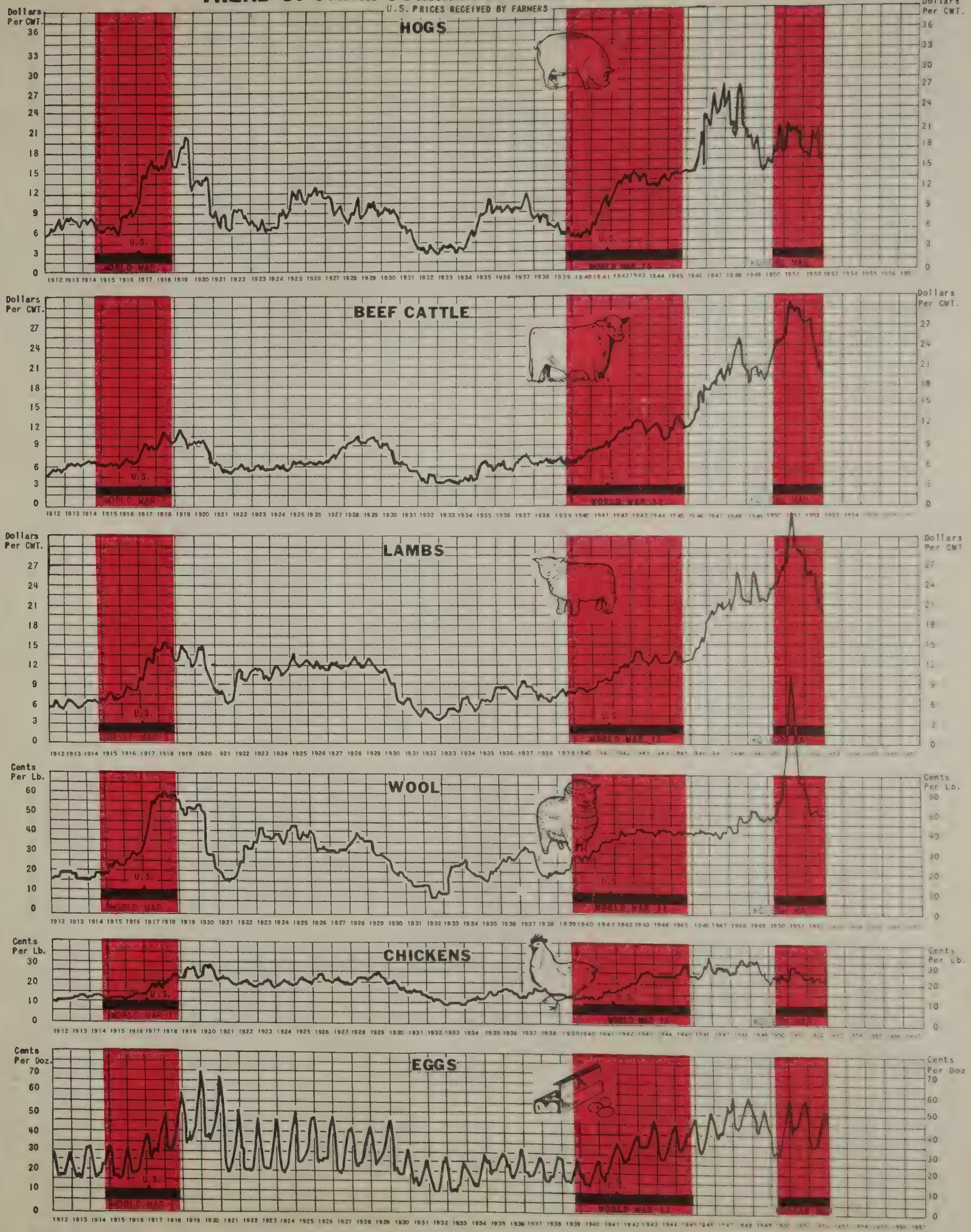
D. Howard Doane

1

Agricultural Outlook

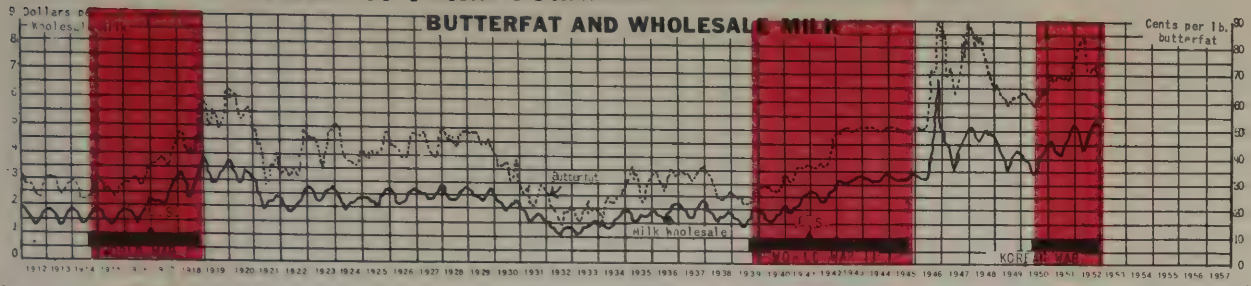
1 Agricultural Outlook

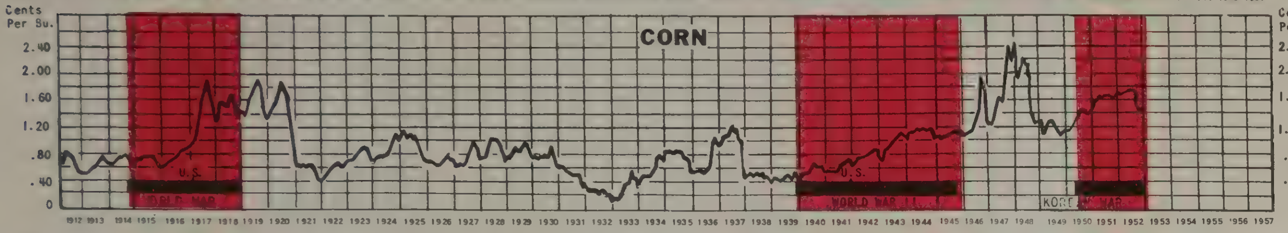
TREND OF FARM COMMODITY PRICES--1912-52

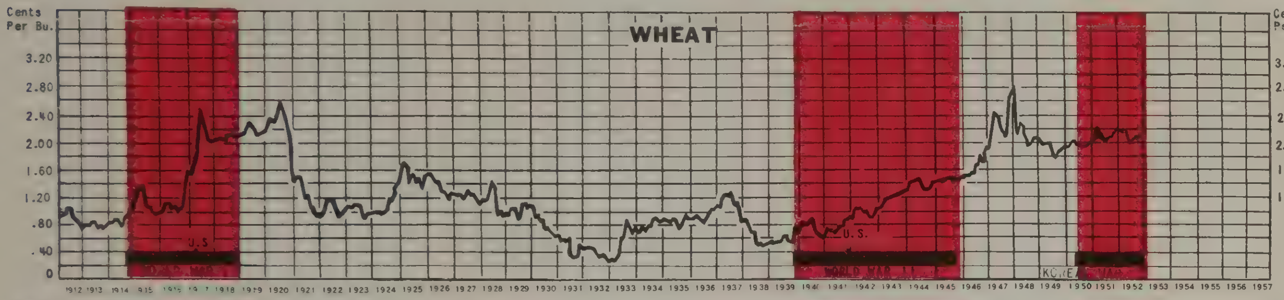


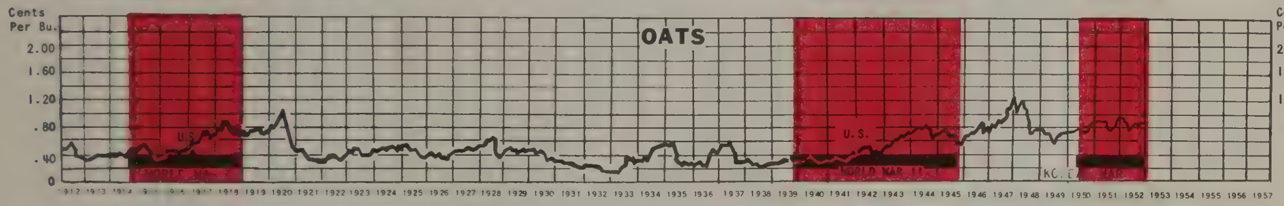
Graphs based on U.S.D.A. data

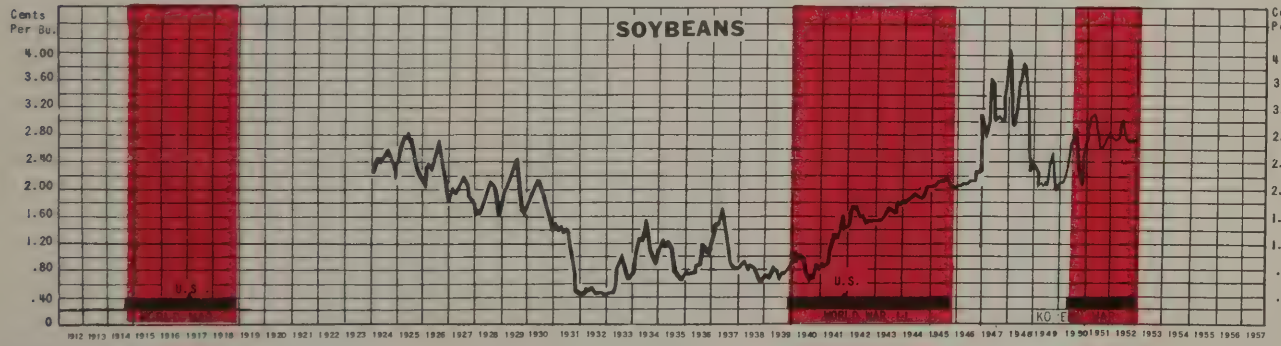
TREND OF FARM COMMODITY PRICES--1912-52

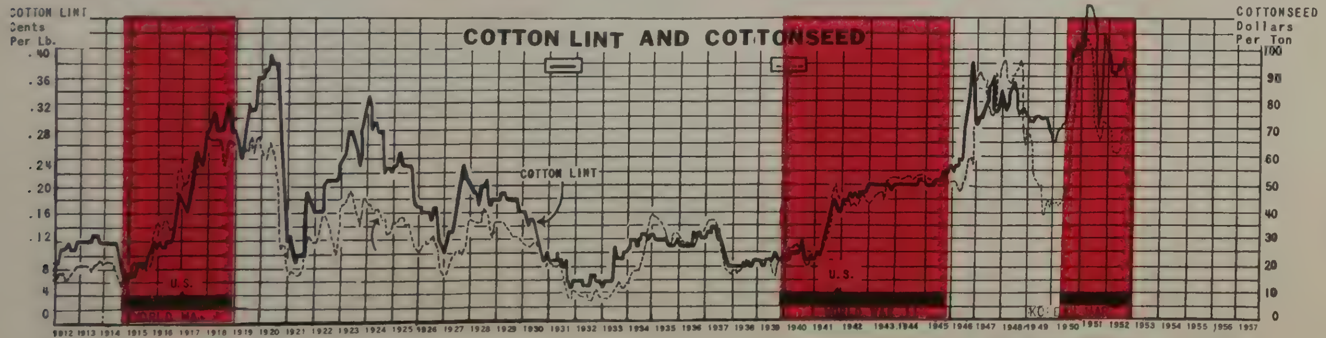












DOANE AGRICULTURAL DIGEST ® JAN., 1953

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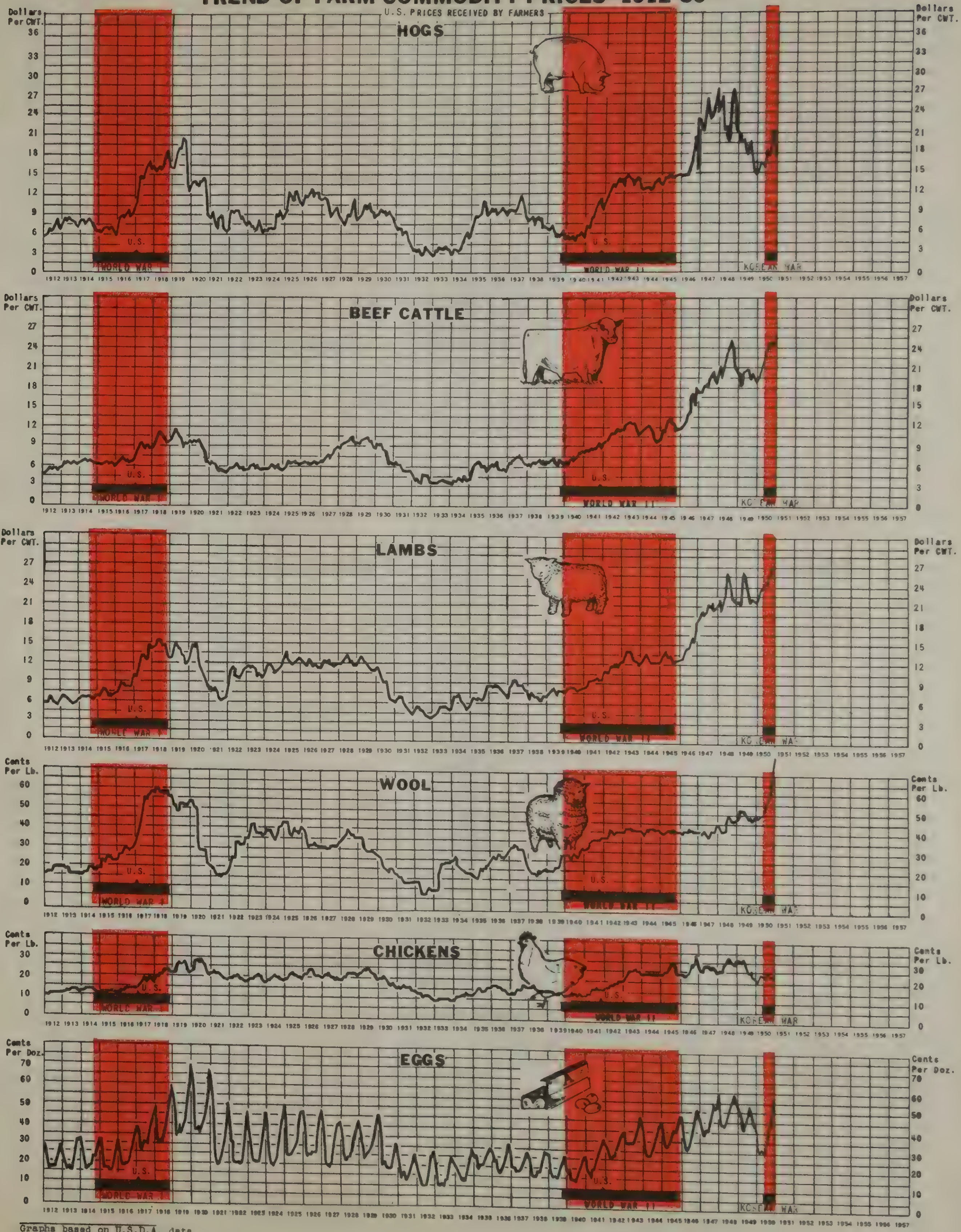
TREND OF FARM COMMODITY PRICES--1912-50

U.S. PRICES RECEIVED BY FARMERS



Graphs based on U.S.D.A. data

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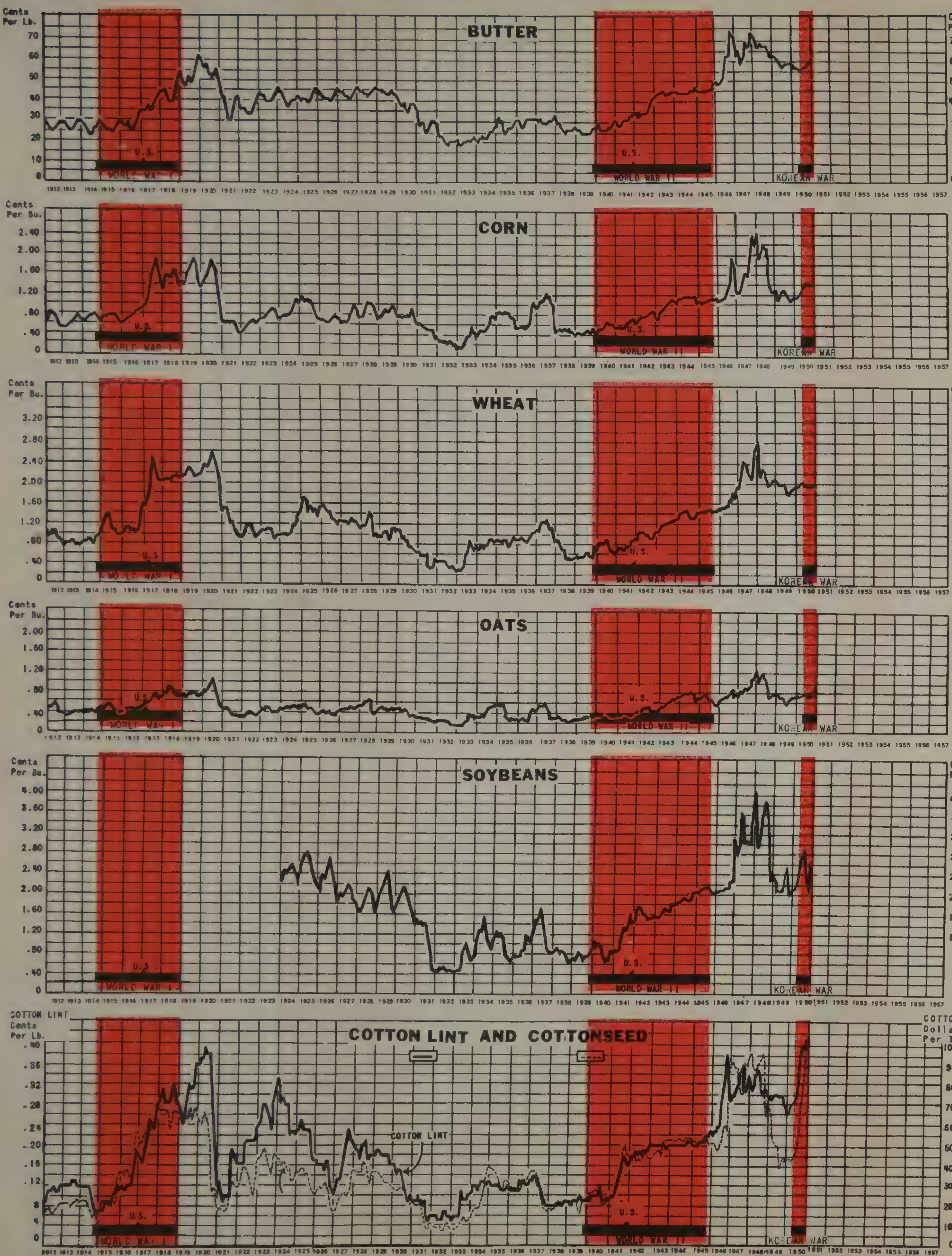
TREND OF FARM COMMODITY PRICES--1912-50



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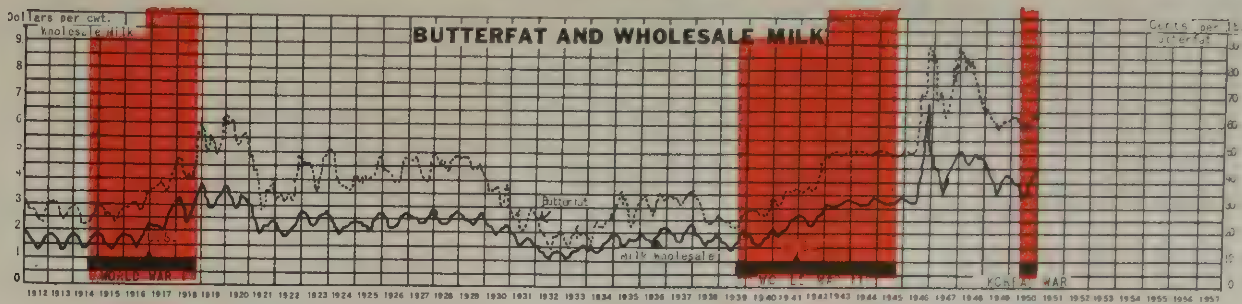
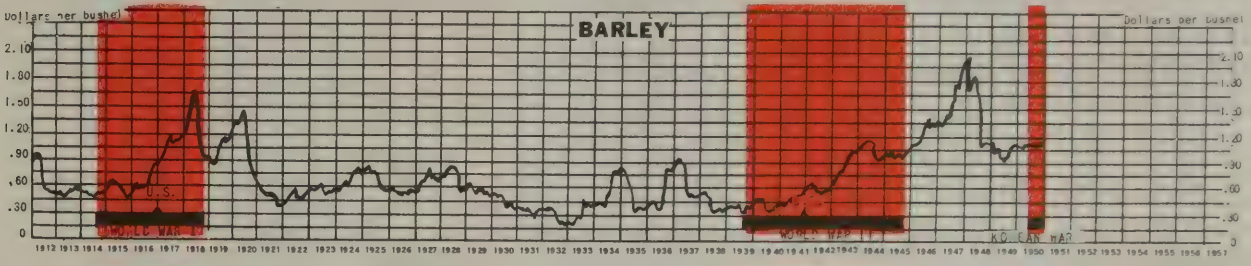
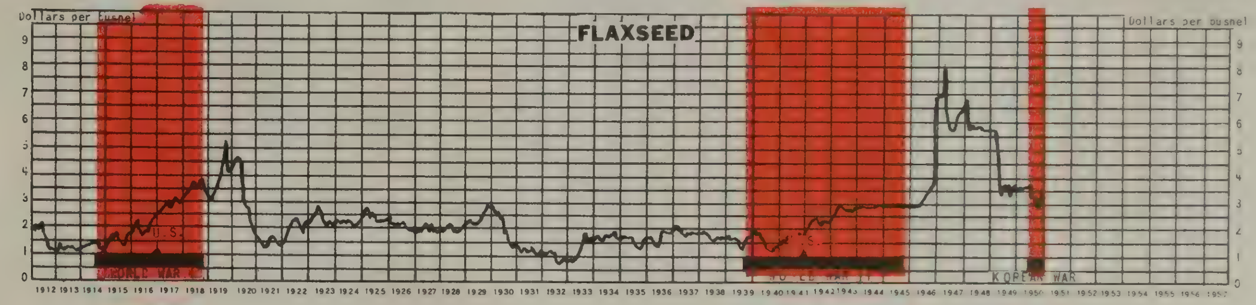
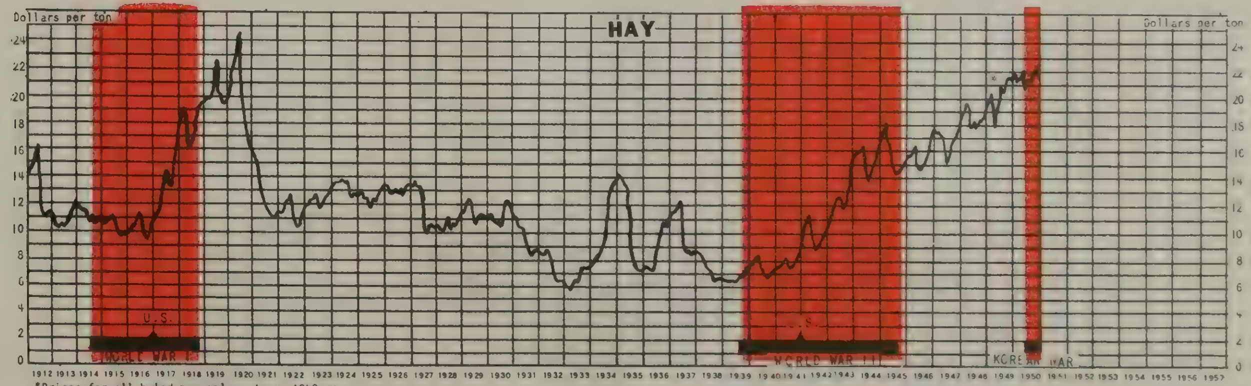
TREND OF FARM COMMODITY PRICES--1912-1950

U.S. PRICES RECEIVED BY FARMERS

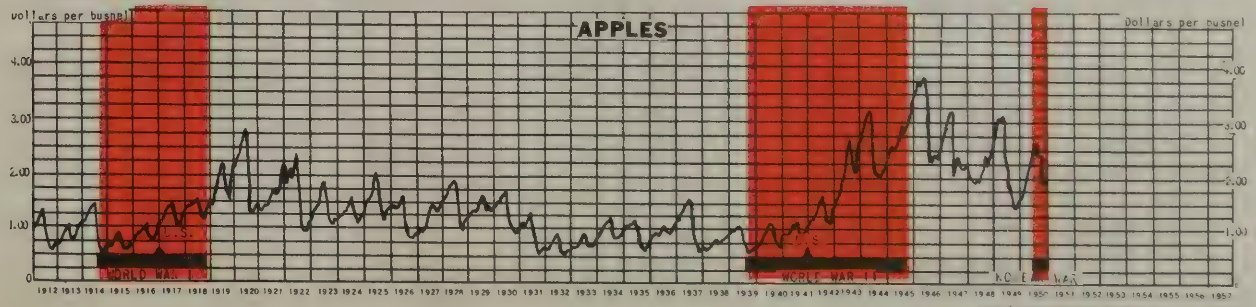








*Prices for all baled hay only - June, 1949 on



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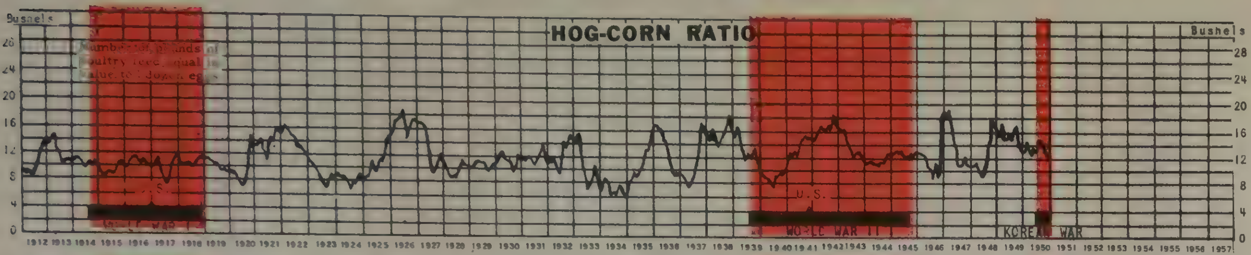
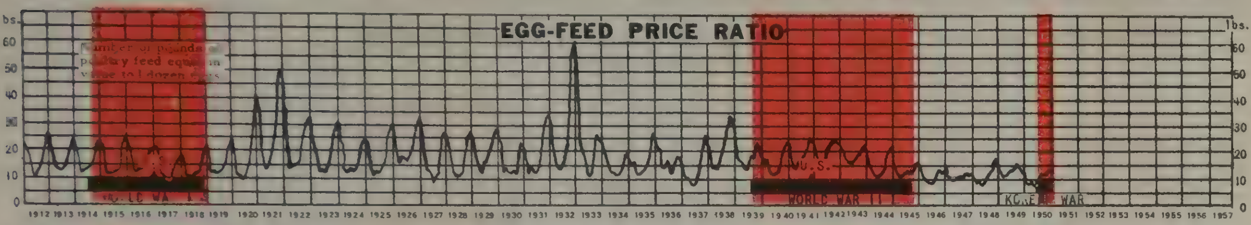
TREND OF FARM COMMODITY PRICES--1912-1950


HOG-CORN RATIO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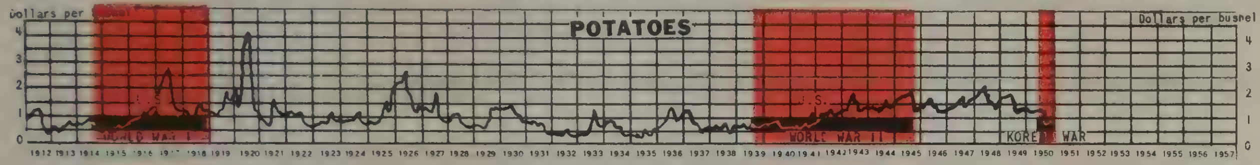
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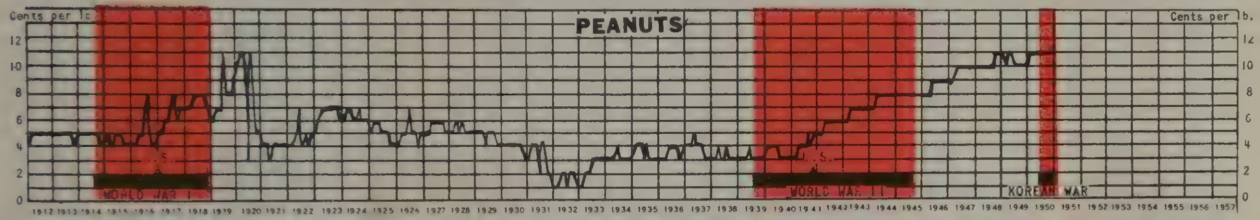
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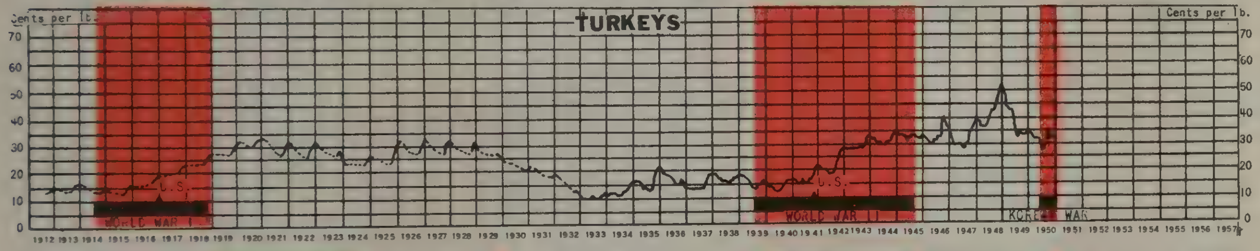
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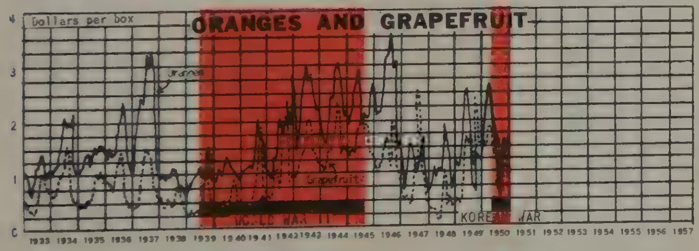
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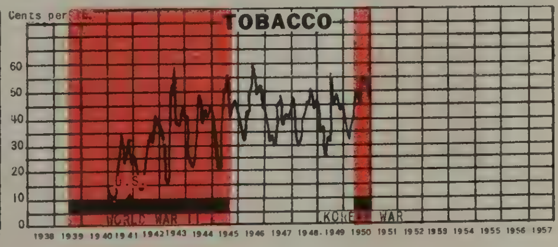
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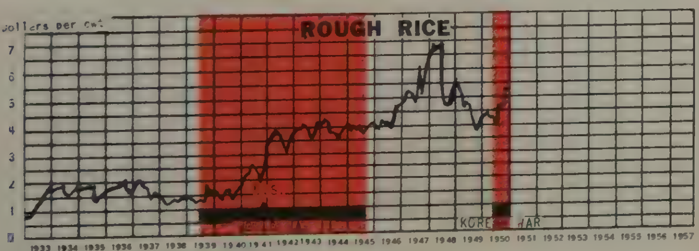
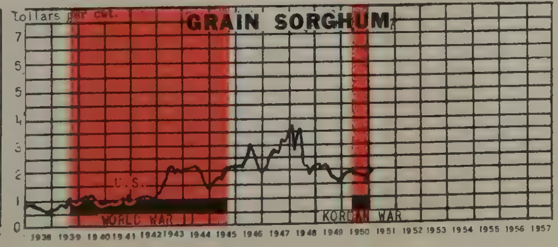
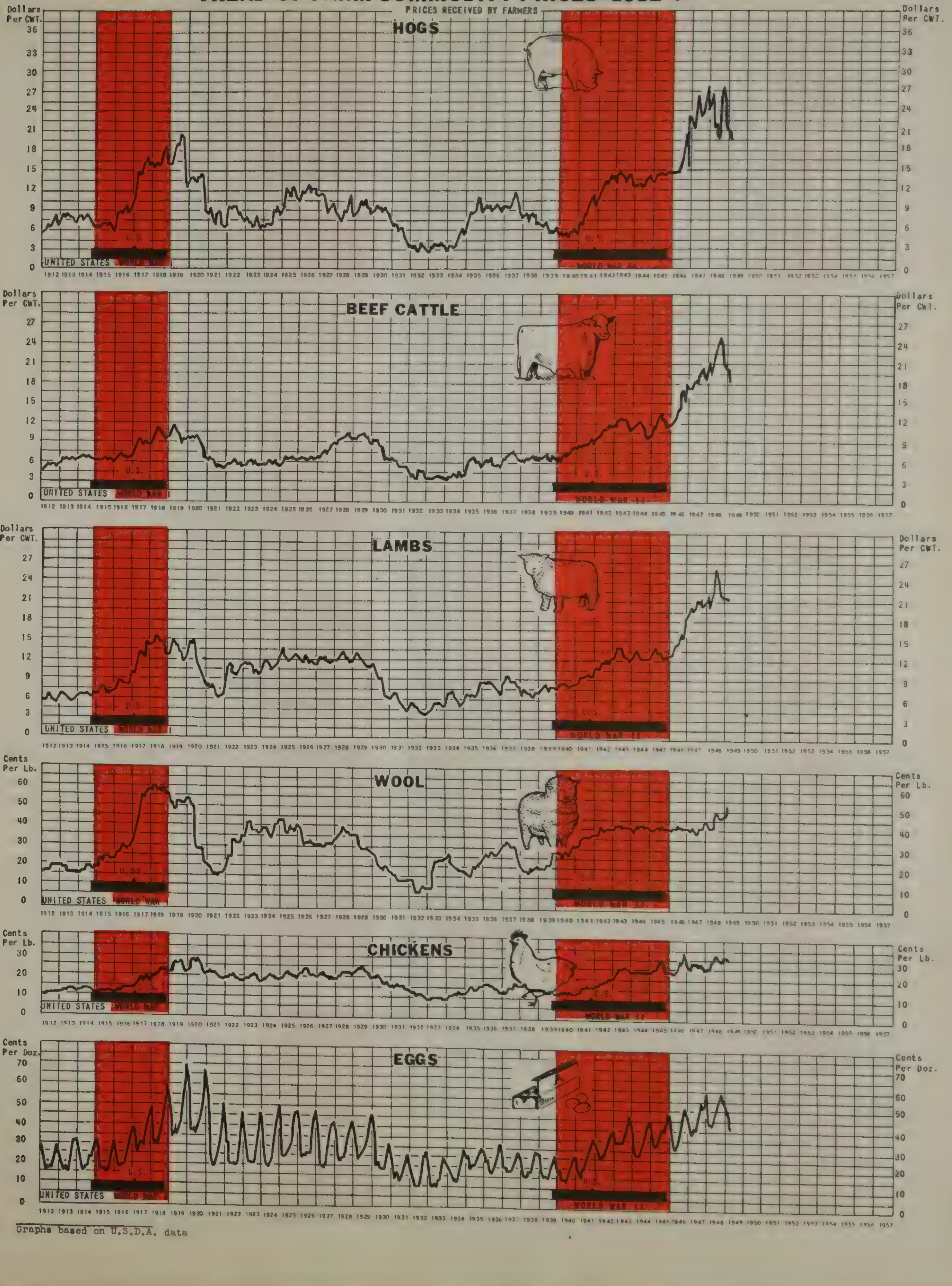

ROUGH RICE


GRAIN SORGHUM

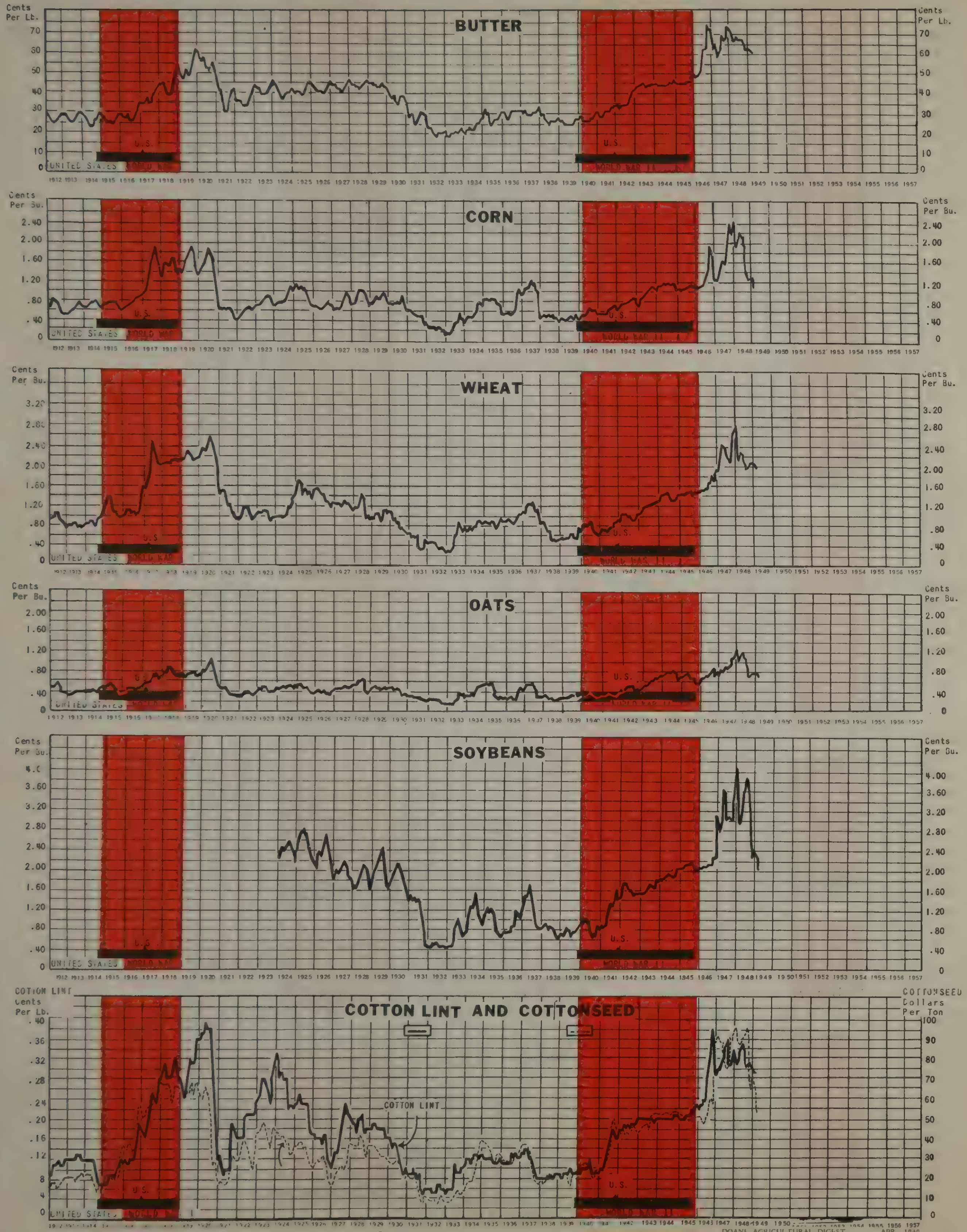
Graphs based on U.S.D.A. data.

TREND OF FARM COMMODITY PRICES--1912-48



Graphs based on U.S.D.A. data

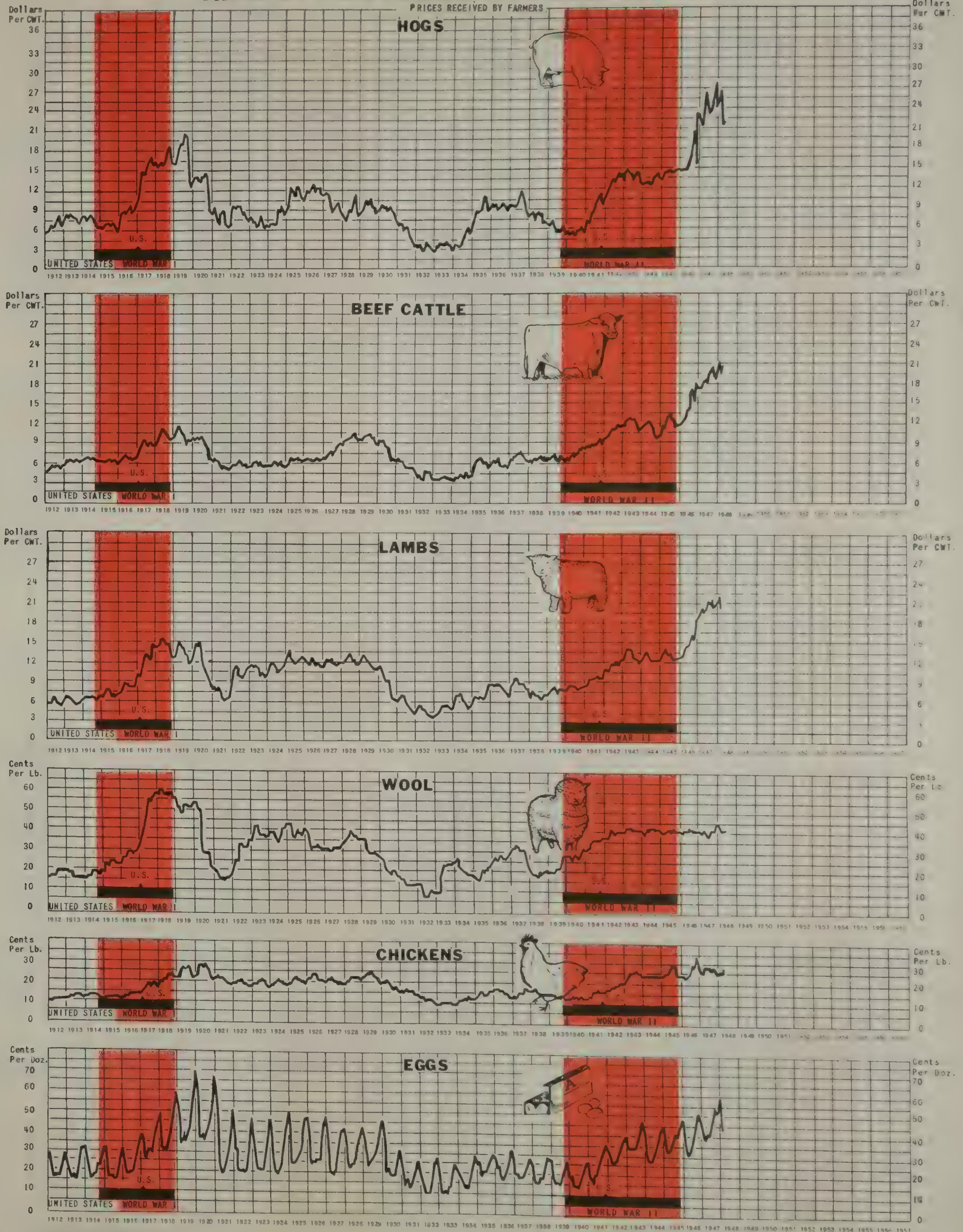
TREND OF FARM COMMODITY PRICES--1912-1948



DOANE AGRICULTURAL DIGEST APR., 1949

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo

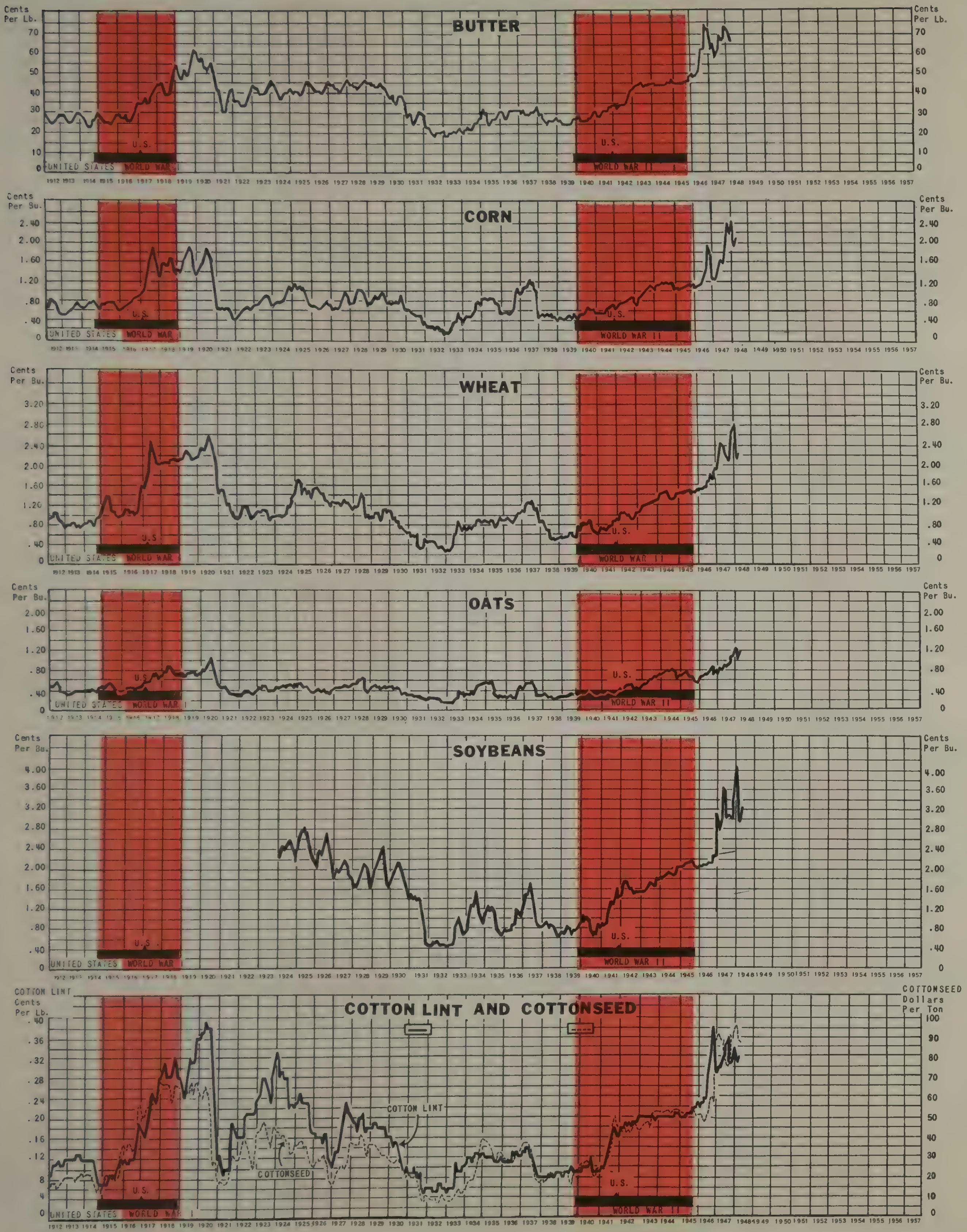
TREND OF FARM COMMODITY PRICES--1912-47



Graphs based on U.S.D.A. data

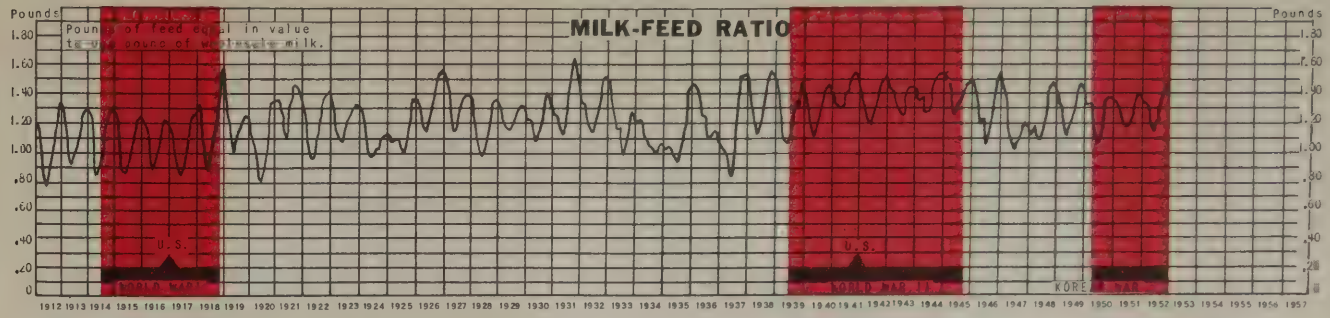
DOANE AGRICULTURAL SERVICE, INC., St Louis 12, Mo.

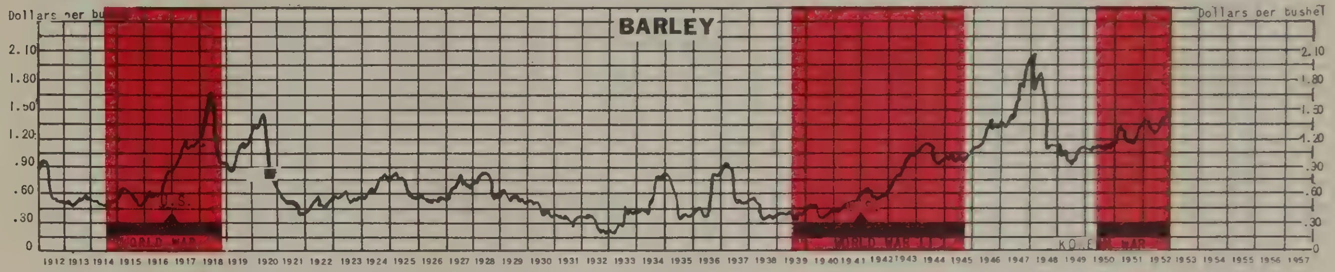
TREND OF FARM COMMODITY PRICES--1912-1947

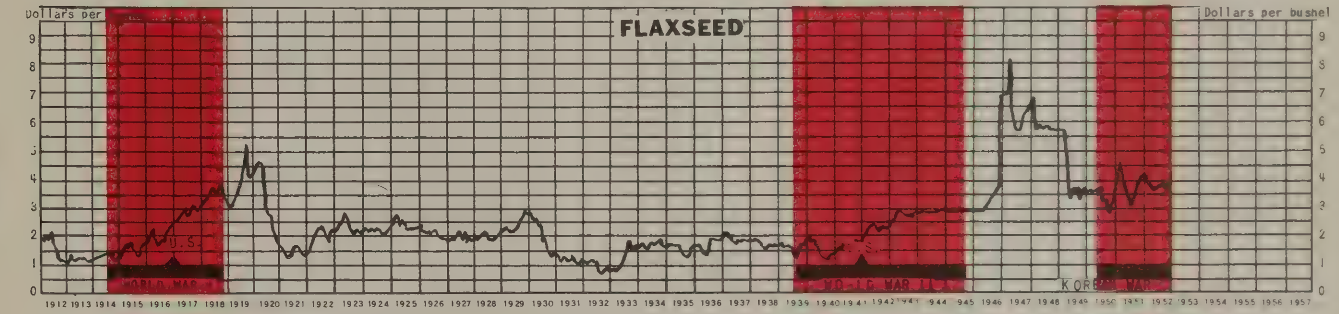


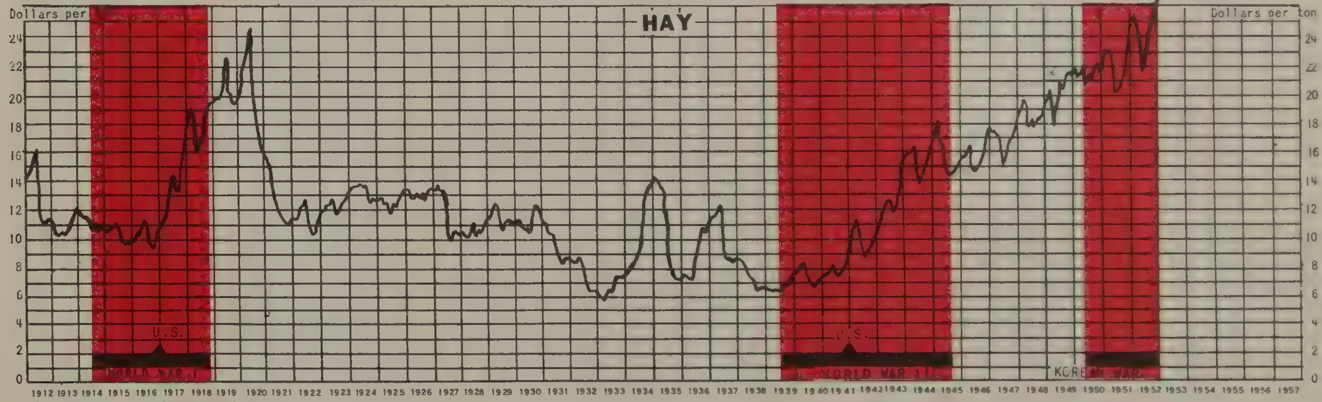
TREND OF FARM COMMODITY PRICES--1912-1952

U.S. PRICES RECEIVED BY FARMERS

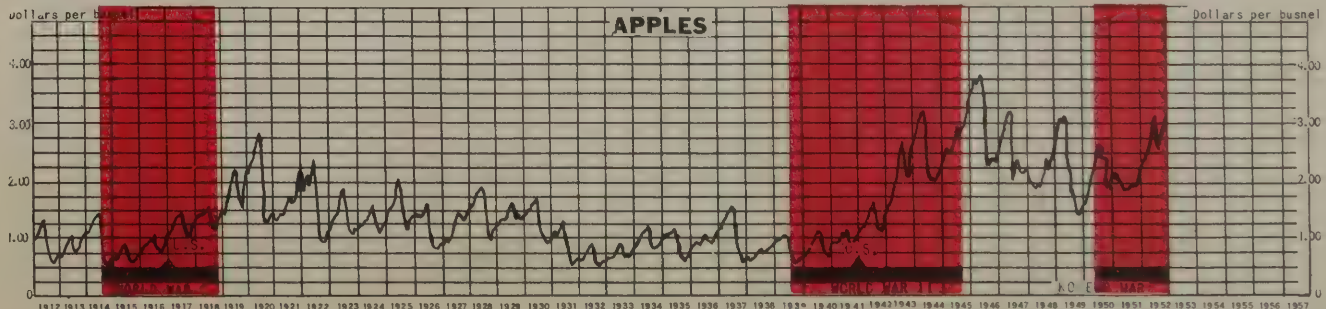






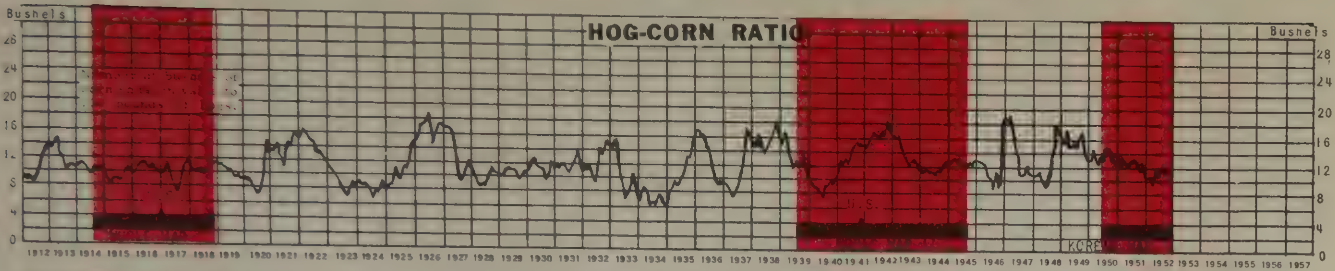


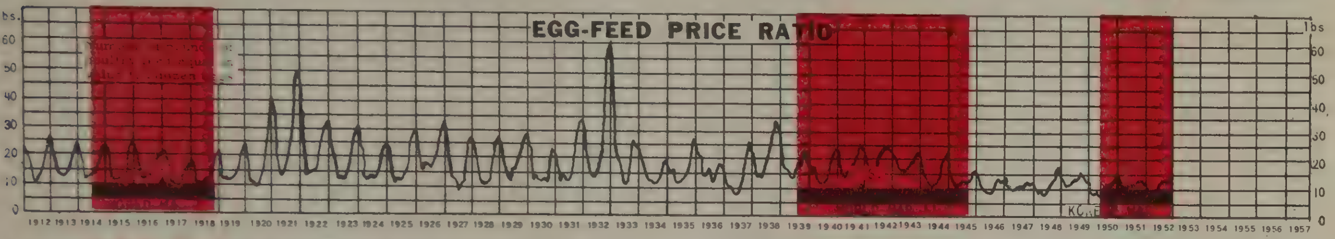
*Prices for all baled hay only - June, 1949 on

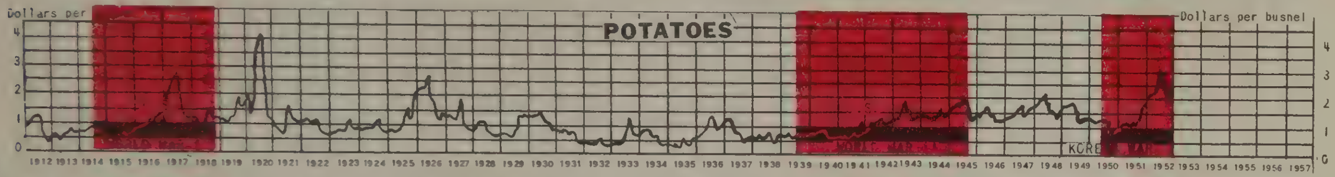


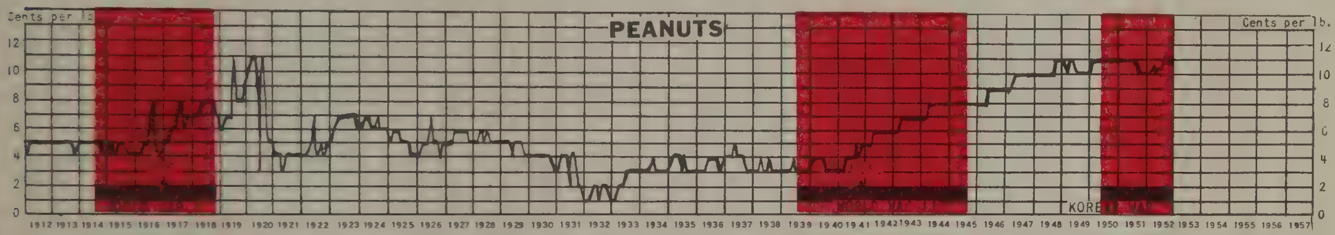
DOANE AGRICULTURAL SERVICE, Inc., St. Louis 8, Mo.

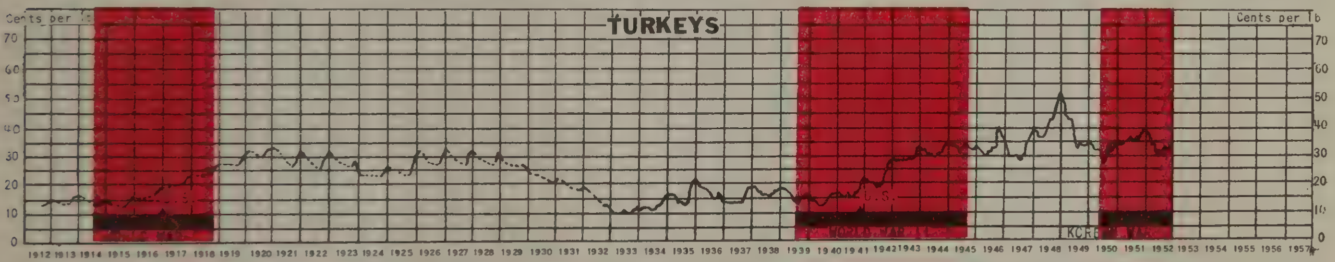
TREND OF FARM COMMODITY PRICES--1912-1952

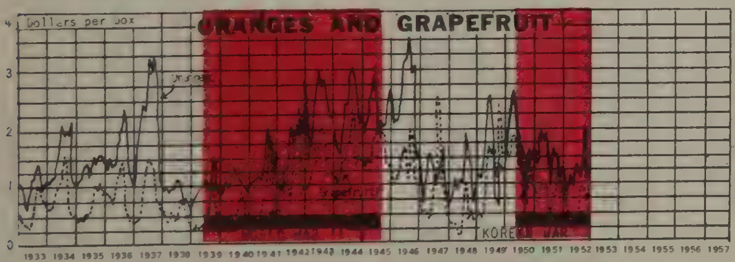


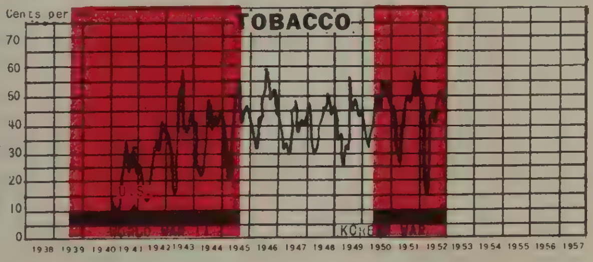


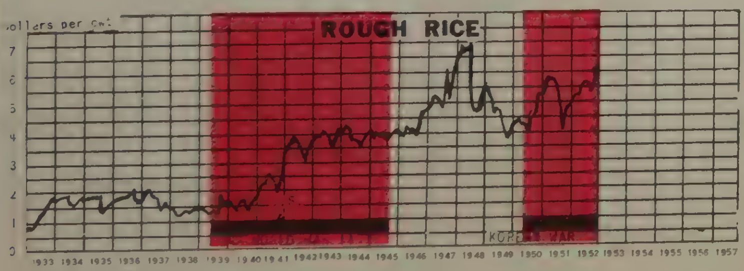


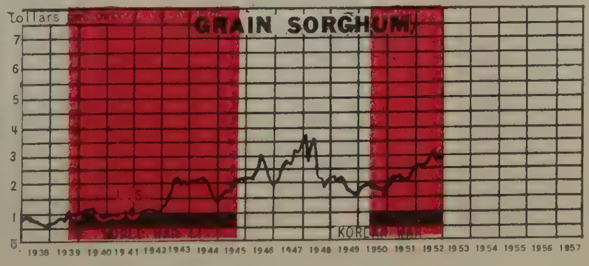






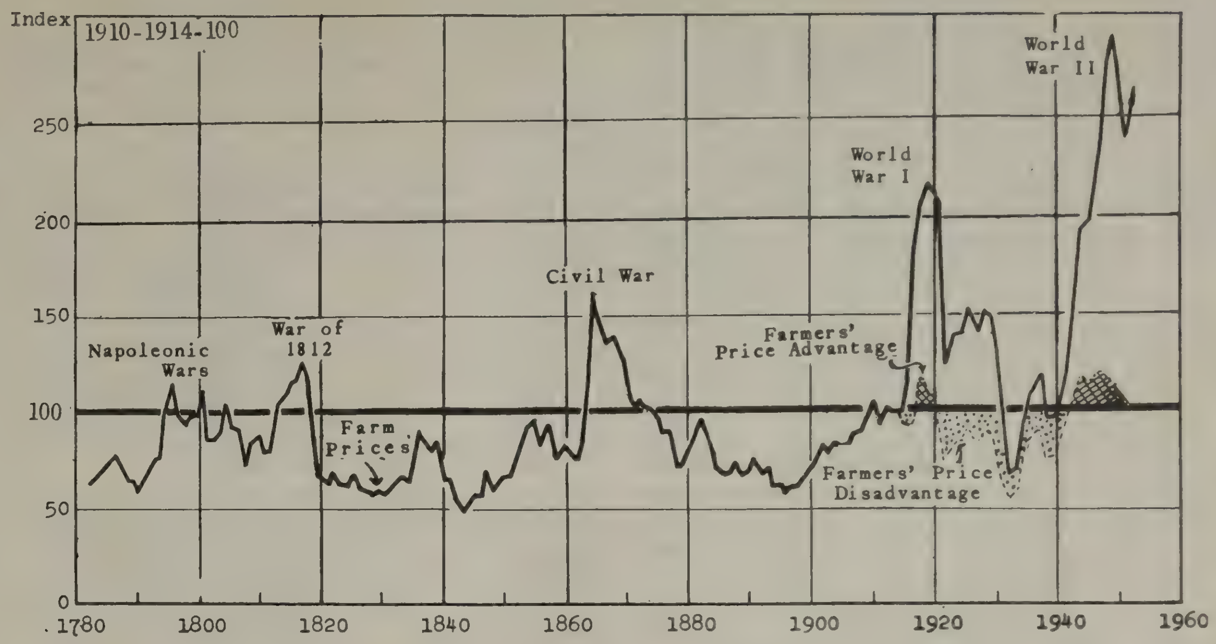






Graphs based on U.S.D.A. data.

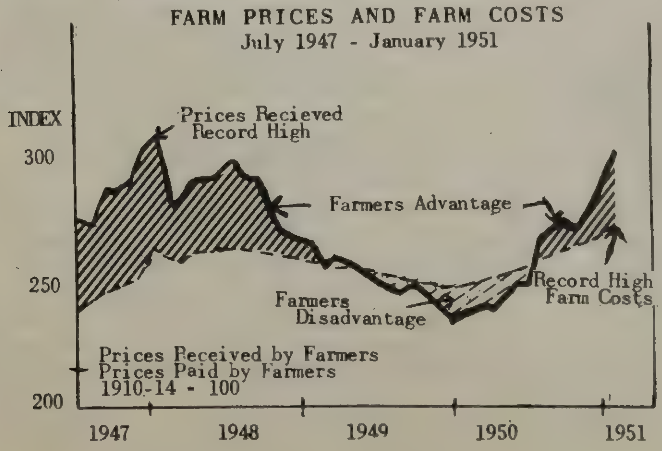
PRICES OF FARM PRODUCTS



THE POST-WAR RECESSION is over for now; prices again spiral upward. New demands for food are being made by consumers with fat pocketbooks, and by our expanding armed forces who eat much more than civilians.

Farm prices hit bottom in December 1949 as "surpluses" of grains, eggs, dairy products, and potatoes flooded the nation's markets. Supporting some crops at 90 per cent of parity did not keep all prices up to that level.

The building boom, record high auto production, and increased production in other industries helped bring a recovery in farm prices. From January to June 1950 prices received by farmers went up 5 per cent.


FARM PRICES AND FARM COSTS
July 1947 - January 1951

THE BIG BUYING SPREE was set off by the outbreak of war in Korea. It came on top of a high rate of industrial and construction activity. Since Korea, farm prices have gone up 21 per cent. Further rises in farm prices seem certain. People with higher wages will buy higher quality (and higher priced) food.

FARM COSTS reached new record highs in November, December, and January. The graph at the left shows that prices paid by farmers rise and fall more slowly than prices farmers receive. This makes farm income uncertain in times of declining prices.

The outlook for farm profits can change very quickly. Just a year ago we seemed to be headed into a long period of declining prices. Now, the peak of advancing prices cannot be seen. This can be a dangerous situation. When everyone expects a movement in one direction -- the exact opposite often happens.

PRICE CONTROLS are not the solution for stopping inflation. The graph at the top of the page shows what happened during the World War II. Price ceilings were placed on practically every item bought and sold by farmers from 1942-1946. They did slow down the official rate of price increase. But, official figures did not show black market of "overage" payments that were in the total price picture at that time. When controls were lifted, the official prices quickly adjusted to reflect actual prices.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U. S. A.)
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FARMING UNDER PRICE CONTROLS

GET READY FOR A LONG PULL -- This national emergency could last a long time -- 5, 10, 20 years or more. Put your soil, machinery, and buildings in shape for a long period of full production -- keep them in shape.

WORLD WAR III is not yet upon us. Do not rush recklessly forward on the basis of all-out-war. It may not come. Keep your position well protected. Never has there been a time of greater need for solid, efficient, business management.

THE PRICE FREEZE does not affect every farm commodity in the same way. Many are still below parity. They can rise to parity before ceilings can be applied. (See page 50, Feb.)

In most cases, ceiling prices are favorable so that you can continue to produce profitably during 1951. But many adjustments will need to be made. "Inequalities" and "escalator clauses" will allow prices and wages to make further increases.

INFLATION will continue as wage freezes are relaxed and farm prices move up to parity under their "legal minimum ceiling." Keep your money invested in productive livestock, equipment, and supplies. Idle cash loses purchasing power quickly in these times.

HIGH PRODUCTION of corn, cotton, and wheat is the big aim. All acreage restrictions have been removed -- price supports at 90 per cent of parity should make these crops profitable.

PROBABLE PRICE SUPPORTS* FOR 1951

CORN	*bu.*	*$1.70*
WHEAT	*bu.*	*2.30*
OATS	*bu.*	*.94 to 1.05*
COTTON	*lb.*	*.32*
SOYBEANS	*bu.*	*2.34 to 2.63*
RICE	*cwt.*	*5.14*

*NATIONAL AVERAGE FARM PRICE

These estimated prices are based on official announcements as interpreted by the research staff.

The big livestock population will consume more feed than we produced in 1950. Whenever possible, plan to raise all the feed you will need to feed your stock. Raising extra feed to carry over to future years will be a good investment.

Soybeans, flaxseed, peanuts, safflower -- all produce valuable oils needed for defense and meal which supplies protein to livestock. The demand will be strong -- prices will move up.

USE FERTILIZER to boost crop production. It's much more economical than buying more land. Plant food prices have gone up much less than prices of crops.

CRITICAL FEED SHORTAGES threaten. Feed deficit areas will be most seriously affected by price controls. Midwest hogs will get corn that might have moved to East and West coast dairy and poultrymen. Some government grain will be held in reserve -- will mean less available in the year ahead.

FIX FEED COSTS by contracting your needs far in advance. Grain prices are usually lowest at harvest time. (See pages 515-516) Protein supplements will also be lower at times when processors are operating at capacity.

STRETCH FEED to produce more meat with less high priced grain. Balance rations with protein supplement -- cheap compared to corn. Supply salt. Tests show that a pound of salt will save 147 pounds of corn and 40 pounds of supplement.

AIM FOR QUANTITY with less emphasis on quality. Put cheap gains on livestock with pasture and roughage. Grass or roughage fed cattle with a short grain feed will sell close to those with long feed in dry lot -- will produce much more net profit. Set up a pasture improvement program on your farm.

PREVENT LOSSES of feed and livestock. Kill rats -- each will eat and waste, in one year, grain worth $3.50 to $5.00 at present prices. Kill weevils and moths in stored grain. Make sure cribs and grain bins are in shape to hold grain without damage. Use feed bunks and self feeders which prevent feed waste.

Guard against disease. Practice livestock sanitation. Get hogs out on clean pasture and vaccinate for cholera before weaning. Kill flies and other insects which torment livestock and slow down production and gains.

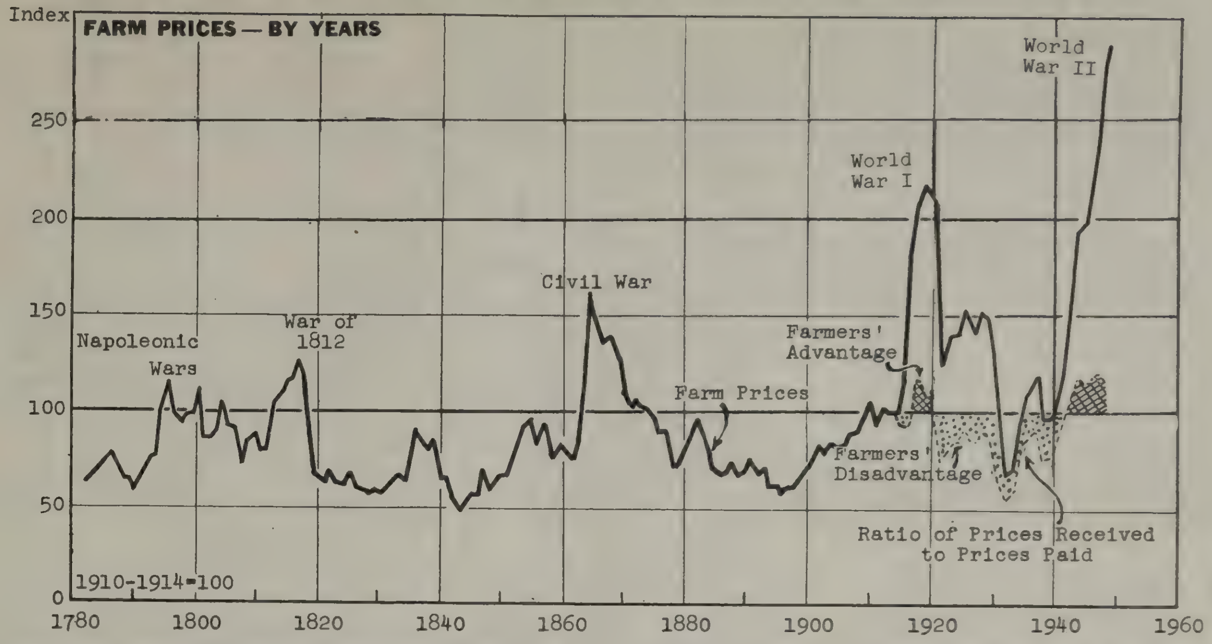
BUY AHEAD -- Seed (especially grasses and legumes) prices are usually lowest at harvest time. Buy certified or good quality seed of adapted varieties -- always a good investment.

☞ INCOME TAXES will be higher in 1951 even though your income may be the same as last year. Complete accurate farm business records will be more important than ever.

Keep a record of sales of used breeding stock which you have owned more than 6 months. You will be able to file them separately and pay taxes on only one half of the profit from these items. Two federal circuit court districts now rule in favor of farmers on this point. Other districts are expected to do the same.

LABOR SHORTAGES will get more serious as more farm boys are called into service and industries offer attractive wages for shorter hours. Arrange buildings and lots to handle feeding operations with less work. If you need more building space, consider low cost pole frame buildings which save time and money.

PRICES OF FARM PRODUCTS -- PASS PEAK

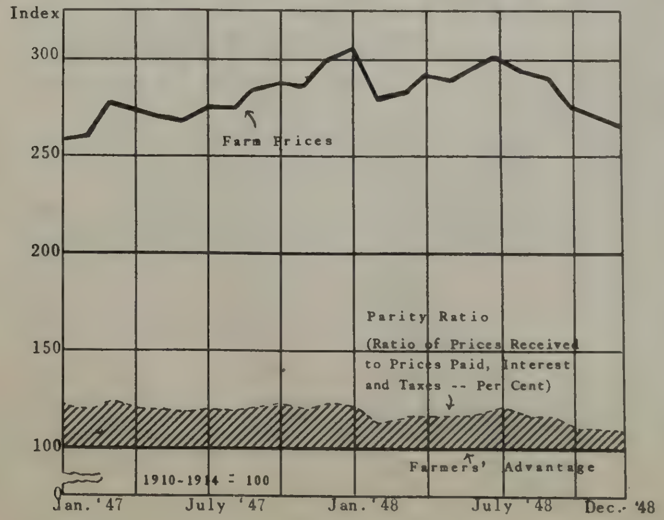


Farmers received higher average prices in 1948 than in any previous year. The peak came in January. Then followed the February break. In July prices again approached the January peak -- in fact, livestock went above the January level. But, the trend is now down and, except for seasonal fluctuations, will continue downward through 1949.

The big graph above shows the yearly movement of farm prices and (by dotted line and shading) the extent of the farmers' advantage or disadvantage, based on the parity ratio. The solid line in the small graph below shows the monthly trend of farm prices for the last two years. The crosshatched area shows the farmers' advantage as compared to price relationships during the period 1910 - 1914.

The farmers' advantage has been declining rapidly since July. By December the parity ratio was down to 109 compared to the all-time peak of 133 in October, 1946 and 122 in January, 1948. It is now at the lowest point since the fall of 1942.

FARM PRICES AND PARITY RATIO by Months



This trend will continue through next year and, as the squeeze on farm income becomes tighter, every segment of our economy will feel the effect. Sales volume in rural areas will be down, banking and credit needs will shift and there will be a growing tendency for farm people to live within their income.

MANAGEMENT POLICIES FOR 1949

1. Optimum production should be the goal. This means highest production possible within limits of most efficient use of machinery, manpower and other operational costs.

2. A big grain acreage in 1949 appears justified because of price support guarantees.

3. Fit your livestock program to your potential feed supply. Make efficient use of pasture and grains.

4. Keep operating costs low and under control.

5. Plan sales of livestock to come earlier than usual.

6. Save enough feed out of current harvest to cover feeding operations until new crops are ready. Beyond this, holding of grain is not justified.

7. Advance buying is no longer necessary and not always advisable. Lay in feed supplies at harvest time and buy fertilizer as soon as you know what your needs will be.

8. Avoid long-time commitments.

9. Pay debts. Get mortgages and debts, that cannot be immediately paid, onto a low interest and long-term basis. Make principal payments in advance before prices go lower.

10. Maintain a safe financial position. Keep enough cash on hand for emergencies.

11. Specialize in a few major high profit enterprises. Develop one major source of crop income and stick to one major class of livestock.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

PREPARING FOR LOWER FARM PRICES

Farm price declines of the past six months were expected and the road ahead leads down. However, no price collapse is expected while folks in town are all working for high wages and the government budget calls for spending 43 billion dollars.

Here are some suggestions that can be worked into your plans for the next few years. They will help maintain income and provide some protection against lower prices.

Beef Cattle - Cow and calf operators are in a much safer position than those who handle feeder cattle. Plan your breeding and feeding program so that you will have cattle and calves on the market when prices are at their seasonal highs. (See Digest Page 211.)

Hog production will be profitable. Carry on with a normal breeding and feeding program. Support prices for hogs will continue through December, 1949, but the level of support will vary. Prices will be permitted to go lower during the heavy marketing seasons than at other times. Feed hogs for the peak markets and market at weights from 200 to 240 pounds. (See Pages 221 & 225.) In selecting new breeding stock, stress bacon type rather than lard type. Premiums will continue to be paid for quality hogs with a minimum of lard - should increase when hogs are sold by grade.

Sheep are in a favorable cyclical position. Stock sheep numbers are at their lowest point on record. Keep flocks up to normal numbers. Good pastures can produce fat lambs that will top the market.

Dairy outlook for the next several years is favorable. Prices of dairy products have government support guarantees until the end of 1949, and consumption will remain high. Breed enough cows to freshen in the fall to keep labor profitably employed throughout the winter, and to provide a good base for the low-cost spring and summer period. Replace old cows and low producers with good young stock; where facilities permit, increase your herd to an efficient size. Feed according to production. Plan chores and include sufficient labor-saving equipment to reduce labor to a minimum.

Poultry numbers can be increased rapidly when grain prices are favorable. Eggs are likely to present a severe price support problem next winter. Farm flocks of less than 300 to 500 hens are usually inefficient and should be either increased or cut down to just enough to supply eggs for the home. Only the best chicks should be bought -- they will be well worth their premium. Efficient, high producing laying flocks will continue to make money. (See Page 253)

Purebred Livestock - Inventory losses, when they come, will mount up much faster on high priced purebred herds than on other types of livestock. A moderate decline in the price of other livestock will result in a much more rapid decline of purebred prices. The conservative program, especially for the small breeder, is to reduce inventories by selling the high priced animals before prices go lower.

Feed Grain and Hay-There will be surpluses if good weather continues. Grain crops needed for feed should be given priority over other cash crops if profits are not materially affected. Farmers who have facilities to market their grain through livestock will receive highest prices. Take a conservative cut in soybean acreage but keep acreage of corn, sorghum and other feed grains high while the lid is still off. Consider legume hay crops where land has been overworked.

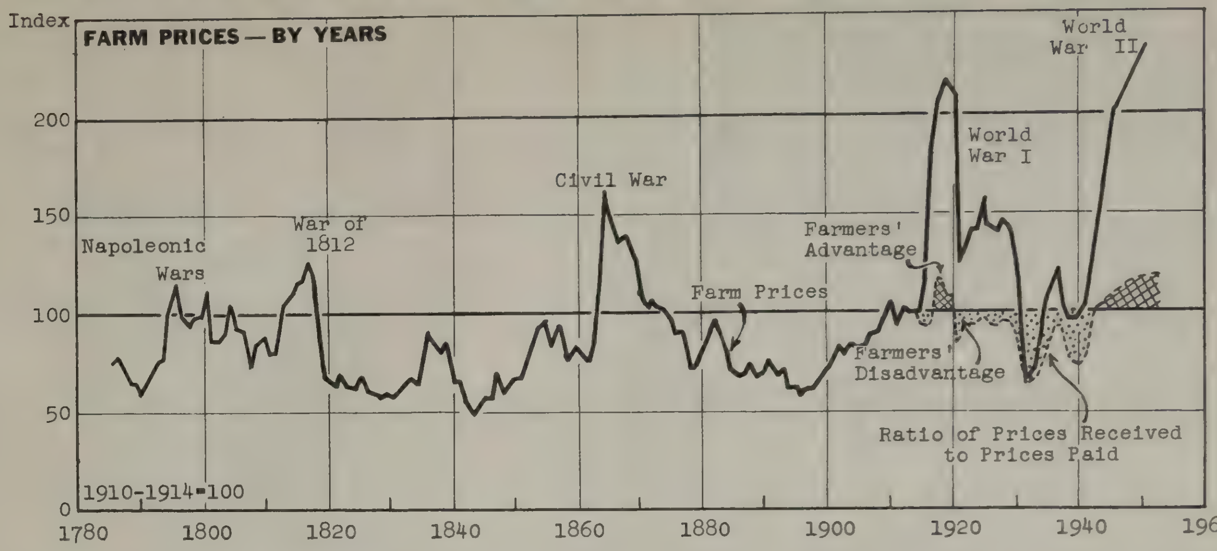
Cotton - Grow a maximum acreage while high prices continue and acreage controls are not in effect. The price of cotton will be supported at 90 per cent of parity until July, 1950. Where a large acreage is grown a picker will materially cut harvesting costs. Continue heavy fertilizer applications. The extra yield will mean a lower cost per bale.

STICK TO YOUR NORMAL PROGRAM

Most farms, by careful planning, can be operated to capacity without engaging in highly speculative types of operations, and without undermining the future producing capacity of the land. Make liberal use of fertilizers and adopt sound soil conservation methods. While prices are high, the return on every dollar invested in fertilizer is high and the carryover in the soil will last for years if applications are heavy.

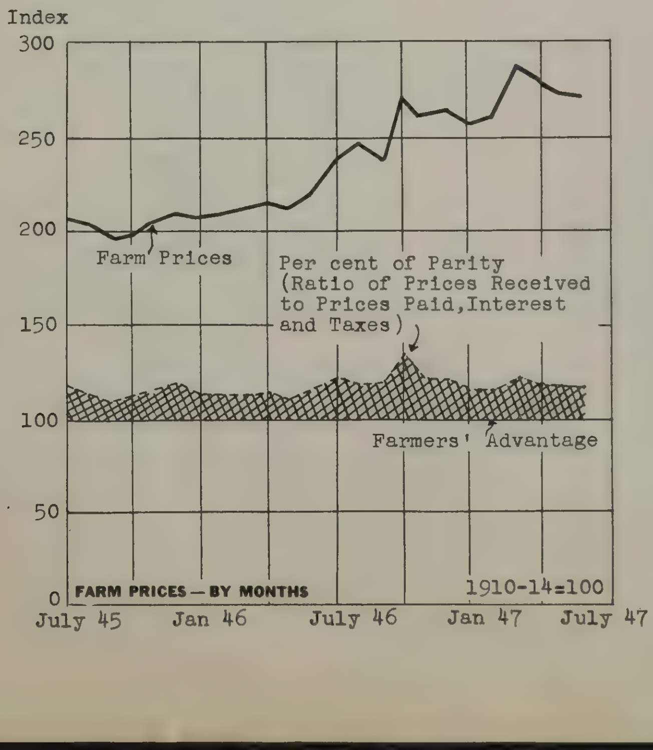
If you have not already done so, complete your long-range farm program now. The surest way to meet the problems that are ahead is to have a good program and stay with it.

PRICES OF FARM PRODUCTS – AT PEAK LEVELS



Farmers received higher prices for their products in 1946 than in any previous year. Prices shot upward when controls were removed in the last half of the year and these high levels have been maintained during 1947 except in fluid milk and other lesser commodities. Unless prices drop severely by the end of the year, which is not now anticipated, the average for 1947 will be well above the 1946 average. The above graph shows the yearly movement of farm prices and (by dotted line and shading) the extent of the farmer's advantage or disadvantage, based on the ratio of prices received to prices paid.

The solid line on the graph below shows the monthly trend of farm prices. The crosshatched area shows the farmer's advantage, or the degree to which prices he receives over-balance prices he pays plus interest and taxes, when these are compared to their relationship during the period 1910-14.



During the past few months, prices paid have continued to advance, while prices received have moved lower. This unfavorable trend will become more pronounced within the next 12 months.

Farmers need to become more cost-conscious in the year ahead.

MANAGEMENT POLICIES FOR 1947-48

1. Optimum production should be the goal. In some cases this means maximum production -- in others it means highest production possible within limits of most efficient use of machinery, manpower and other operational costs.

2. Maximum grain production through 1948 appears justified, provided this does not call for large investments in machinery above normal needs. Price supports on corn, wheat and rice are certain until the end of 1948 and these will, in turn, tend to support other grains.

3. Fit your livestock program to your potential feed supply. Make most efficient use of pasture and grains.

4. Keep operating costs low and under control.

5. Plan sales for the normally high seasonal periods.

6. Save enough feed to cover feeding operations. Delayed marketing is not justified and that which goes beyond orderly marketing is pure speculation.

7. Do not delay purchases that must be made within the relatively near future. Lay in feed supplies at harvest time.

8. Buy and build essentials only.

9. Avoid long-time commitments and debts.

10. Pay debts. Get mortgages and debts that cannot be immediately paid, onto a low interest and long-term basis. Make principal payments in advance.

11. Maintain a safe financial position. No one knows how long high prices will last but they could break at almost any time.

DOANE AGRICULTURAL SERVICE, Inc., St. Louis 12, Mo.

PREPARING FOR LOWER FARM PRICES

After each major war in which this nation has been engaged, there has occurred a period of hesitancy lasting from 3 to 6 months while industry was being shifted back to civilian production. In every case, this period has been followed immediately by a postwar replacement boom which lasted approximately two years.

When the Armistice was signed in 1918, hesitancy ruled until March, 1919. During this time prices of several farm products followed an uneven downward trend. Then, when the replacement boom got under way, nearly all farm prices advanced to higher levels than during the war period. The postwar collapse did not come until the fall of 1920, nearly two years after hostilities ceased.

Although events following World War II have differed in many respects from those following World War I, the general pattern has been similar. We are still in the boom phase, from which price declines can be expected.

There has been no general decrease in the prices of farm products up to the present time. There have been decreases in the prices of some products, such as fruits and vegetables. There will be no collapse of farm prices while domestic employment and buying power remain high and we continue to send food to the starving peoples of the world. Because of the greater destruction and magnitude of World War II, it may take longer to fill these shortages. Prices of some products will decline much sooner than others, but farmers should guard against hasty liquidation when these declines begin. It is poor business management to wreck a good farm program.

Here are some suggestions that can be worked into your plans for the next few years which will help produce greater returns during the present period of scarcity, and provide some protection against the impending decline of farm prices:

BEEF CATTLE -The position of beef cattle is speculative. If you have your own breeding herd, plan your breeding and feeding program so that you will market your calves during the peak months. (See Digest Page 211.)

Cheapest gains can be made with hay and pasture. Plan for an ample supply of both. Keep costs down. Stick to conservative cattle-feeding operations, making maximum use of pasture, hay and roughage to produce gains.

Cull old and defective cows from your herd while prices are still high. Make greater inventory reductions by selling the highest priced animals. They may not be profitable when prices decline.

HOGS -Production will be profitable throughout this year. Carry on with a normal breeding and feeding program. There are no indications of an oversupply of pork within the next few years.

Support prices for hogs will continue through September 1948, but the level of support will vary. Prices will be permitted to go lower during the heavy marketing seasons than at other times. Feed hogs for the peak markets, and market at weights from 200 to 240 pounds. Use plenty of legume pasture to cheapen gains and to conserve feed. (See Digest Page 221.)

Do not sell hogs because of a shortage of corn. Use substitute feeds, if possible, and good grass or legume pasture.

Lard will again be a drug on the market within the next few years. In selecting new breeding stock, stress bacon type rather than lard type. Premiums will be paid for quality hogs.

SHEEP are in a favorable cyclical position. Stock sheep numbers are at their lowest point on record. Keep farm flocks up to normal numbers and feed for efficient gains. Good pastures can produce fat lambs that will top the market.

DAIRY The outlook for dairy farmers for the next several years is favorable. Prices of dairy products have government price support guarantees until the end of 1948, and consumption will remain high. Breed enough cows to freshen in the fall to keep labor profitably employed throughout the winter, and provide a good market base for the low-cost spring and summer period. Replace old cows and low producers with good young stock.

Feed for most efficient production. In areas where grain feeds are too high, decrease the amount of grain fed and increase the use of hay, pasture and silage.

Decrease the cost of labor through the use of labor-saving equipment and by planning barn interiors. Decrease the time required to do the milking, feeding and other chores.

POULTRY Feed will be a big problem for poultry raisers during the next 12 months. Costs will be high and in some areas feed will be scarce. However, efficient production is not possible with half-filled laying houses. Farm flocks should be kept up to normal. Commercial raisers should be sure of their feed supplies for this year's hatch and give first consideration to raising good, healthy pullets.

Efficient, high-producing laying flocks will make money.

PURE BRED LIVESTOCK - Inventory losses, when they come, will mount up much faster on high priced purebred herds than on other types of livestock. A moderate decline in the price of other livestock will result in a much more rapid decline of purebred prices. The conservative program, especially for small breeders who have entered the purebred business since the beginning of the war, will be to sell the high-priced, animals now, while prices are still high.

FEED GRAIN AND HAY There is no prospect of a serious surplus of any grain during the next few years. Grain crops needed for feed should be given priority over other cash crops, if profits are not materially affected. Take a conservative cut in soybean acreage but keep the acreage of corn, sorghum and other feed grain high.

Legume hay crops will fit in well with soil conservation plans, and also provide a feed reserve for livestock.

COTTON Grow a maximum acreage while high prices continue. The price of cotton will be supported at 92½ per cent of parity, at least until December 1948. This insures cotton farmers a high return on their crop for 1 more crop season after 1947.

DO NOT DEPART RADICALLY FROM A NORMAL PROGRAM

Most farms, by careful planning, can be operated to capacity without engaging in highly speculative types of operation, and without undermining the future producing capacity of the land. Make liberal use of fertilizers and adopt sound soil conservation methods. While prices are high the return on every dollar invested in fertilizer is high and the carryover in the soil will last for several years if applications are heavy.

The above recommendations will not fit into every farm program, but they can be used as a guide in planning individual programs. Their adoption will depend upon the type of farm and the financial position of the owner. In some cases, income tax considerations may make it advisable to lay more stress on conservation and future earnings than on maximum earnings now.

If you have not already done so, complete your long-range farm program now. The surest way to meet the problems that are ahead is to have a good program and stay with it.

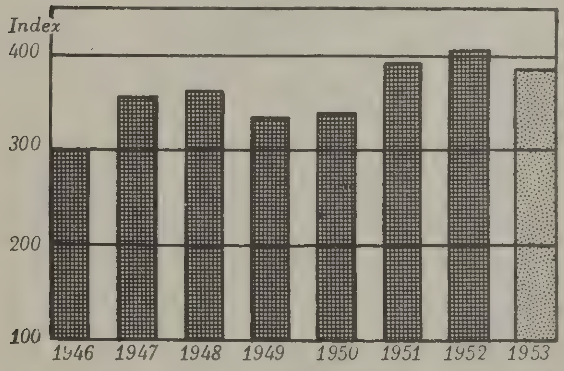
A LOOK AHEAD AT FARM INCOME

EXPECTED RECEIPTS FOR 1953 FARM MARKETINGS

HIGHER THAN 1952		SAME TO 5% LOWER		DOWN OVER 5%
All Farm Costs	Corn	Total Cash Receipts	Citrus	Net Farm income
Dairy Products	Flax	Hogs	Sweet Potatoes	Beef
Eggs	Grain Sorghums	Sheep & Lambs	Oats	Potatoes
Broilers	Cottonseed	Wool	Peanuts	Wheat
		Tobacco	Apples	Cotton
		Rice	Soybeans	Turkeys
			Truck Crops	

Farm profits for 1953 will average lower. More cash will be required to operate the farm and returns for crops and livestock may be slightly lower. Farm people will have less money to spend on personal wants, and may have more difficulty making payments on outstanding debts.

CASH RECEIPTS FROM FARMING
1935-39 = 100



1953 ESTIMATED USDA DATA

Total Cash Receipts should remain close to 1952 levels. Domestic demand will remain high but fewer agricultural products will be exported. Prices received for farm products will probably be a little lower.

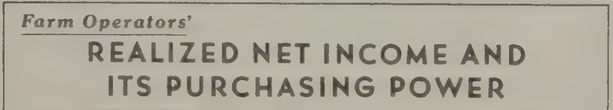
Livestock And Livestock Products -- Cash receipts were 6 per cent lower in 1952 than for 1951. Receipts from meat animals alone were off 9 per cent despite a 4 per cent increase in marketings. Cash receipts for dairy products were up 5 per cent. Total receipts for livestock and their products in 1953 are likely to be about the same as those of 1952.

Crops -- Cash receipts were at a record high for 1952 -- 13 per cent above 1951. This was largely a result of increased volume marketed, but prices of some farm products were up. In 1953, total marketings may again equal the record volume set in 1952, but only if weather conditions are at least average.

Farm Costs will be up from 2-3 per cent -- about half the increase shown in 1952. Last year's operating expenses were the highest ever recorded. Record employment and peak expenditures for the defense program will support these higher prices for farm needs.

Net Farm Income is what remains after total production expenses are subtracted from gross income. In 1952, it was slightly below 1951, can be expected to decline about 5 per cent in 1953 according to USDA. A bigger decline seems more likely.

As always, individual farm income will be largely dependent on the types of crops and livestock produced. Some of these will be in a better position dollarwise in the year ahead, many in poorer shape. Here's the way cash receipts look for the various crops and livestock.



Farm Operators'
REALIZED NET INCOME AND ITS PURCHASING POWER

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

Cotton production ought to be about the same. Acreage harvested may be larger, but yields will not likely be as high. Price won't average much above support level -- cash income will be down.

Cottonseed sales will be up, price about the same. Cash receipts above last year.

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A LOOK AHEAD AT FARM INCOME

FLAX SUPPORT has been jacked up another 2¢, now is $3.79 per bushel. Acreage will be expanded, but not greatly. There are fewer in and outers in flax than previously. Cash receipts for the crop will be up.

BEEF CATTLE MARKETINGS may be up another 10 per cent -- or more in 1953. Price will be down but the decline won't be as steep as last year's, nor come as early in the summer. Increased marketings won't make up for lower prices. Cash receipts from cattle marketings will be down 4-6 per cent.

DAIRY PRODUCTS are one of the safest bets for increased receipts in 1953. Per capita supply is near an all time low -- income way up. Cow numbers equal to 1952 could produce more milk next year if pastures have at least average rainfall -- price for this milk will be up. Dairy cow numbers will likely be increased. Dairying is becoming more and more profitable relative to other enterprises, and large numbers of heifers are on hand.

HOG PRODUCTION is more likely to be decreased rather than increased. Corn-hog ratio is still unfavorable but supports won't allow corn price to drop much lower. Adjustment will have to come about through reduced hog production and higher hog prices. Smaller marketings in 1953 probably won't up price much. Cash receipts for hogs will be down 2-3 per cent.

SHEEP AND LAMB slaughter will be down. Price will be as good or better than '52. Lack of wheat pasture had much to do with the weakness in the feeder lamb market last fall. Farm flocks will pay in 1953.

WOOL price will repeat itself in the coming year or improve slightly. Wool clip may be smaller with close culling last fall and poorer feed this winter. Cash receipts for the sheep industry should remain close to present levels.

EGG PRODUCTION in the first half of 1953 will be less than average. Numbers of layers on December 1 were about the same as a year ago, but number of pullets not of laying age was 48 per cent below average. Price will average better with less layers in the picture. Cash receipts will be up as much as 5 per cent.

TURKEY PRODUCTION will likely be below the 1952 crop -- price steady until fall. Returns will be off more than 5 per cent.

BROILER INCOME will be up more than 5 per cent. Production will increase -- price remain stable.

CORN -- Production goals in 1953 will be close to the 3.5 billion bushels set for '52. Chances of meeting this are slim unless the Corn Belt has another year of excellent weather. However, a large portion of the '52 crop will be marketed in 1953. Price and cash receipts will remain near 1952 levels.

WHEAT -- Cash receipts are likely to be down more than 20 per cent from 1952. Crop will not be as large. Price will average near support level.

OATS ACREAGE -- Not much change, but production should be up. Price will probably be about the same. Cash receipts for the crop close to those for 1952.

SOYBEAN acreage may be up in 1953. Soy Belt can't expect to meet 1952's yields without very favorable weather.

GRAIN SORGHUM production will more than double in the year ahead. This is the crop most often used where wheat seedings have failed. Price will remain close to present levels. Cash receipts will be up.

SUGAR BEETS will be more popular in the coming season. Several of the competing crops -- potatoes and onions -- won't show up as well. Beet price will be about the same. Returns from the entire crop are likely to exceed those of 1952.

POTATO GROWERS may increase acreage 10 per cent in the year ahead. Government goals call for a 5,000 acre increase, but two years of high prices make a larger increase tempting. Increased production could slump price much more than enough to offset increased sales. Cash receipts are likely to be down more than 5 per cent.

RICE PRICES have been extremely favorable and acreage is likely to be increased in 1953. Domestic and foreign demand will likely remain high and prices stable. Cash returns for the crop will be up.

PEANUT ACREAGE will be about same. Price may be slightly better. Cash receipts up.

TOBACCO PRICES have weakened and acreage allotments have been cut. However, increased yields are likely in the year ahead. Cash receipts for the crop should remain close to 1952 levels.

APPLES -- Crop is likely to be larger and prices somewhat lower. Apple growers will have a smaller share of cash receipts in '53.

CITRUS PACK will be larger -- orange harvest to be 19 per cent above average, lemons 4 per cent above. A 25 per cent smaller grapefruit pack is expected. Some price decline is likely, but increased marketing will hold cash receipts at a high level.

TRUCK CROPS for consumer market will increase. Prices will be lower. Cash receipts same or lower.

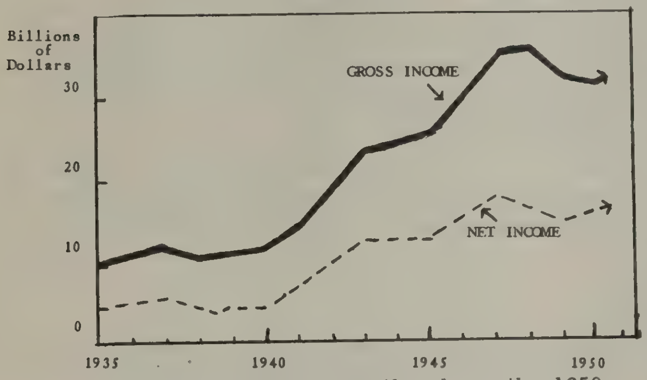
A LOOK AHEAD AT FARM INCOME

GROSS FARM INCOME in 1951 will go up to at least 35 billion dollars -- ten per cent above the estimated 1950 gross income of 31.8 billion and equal to the record year, 1948.

Net farm income will likely be around 15.3 billion -- up 15 per cent from 1950 but still 7 per cent below 1948. Both production and prices of many farm products will increase. Gross farm income gets an extra boost when this happens.

TOTAL FARM INCOME, U.S.

1935 - 1950



Present prices are greatly above the 1950 average. Price ceilings, if put into effect at parity or May 24-June 24, 1950 levels will allow most prices to go still higher. Ceilings applied at the limit set by the Defense Act of 1950 will still allow a 10 per cent increase in gross farm income in 1951.

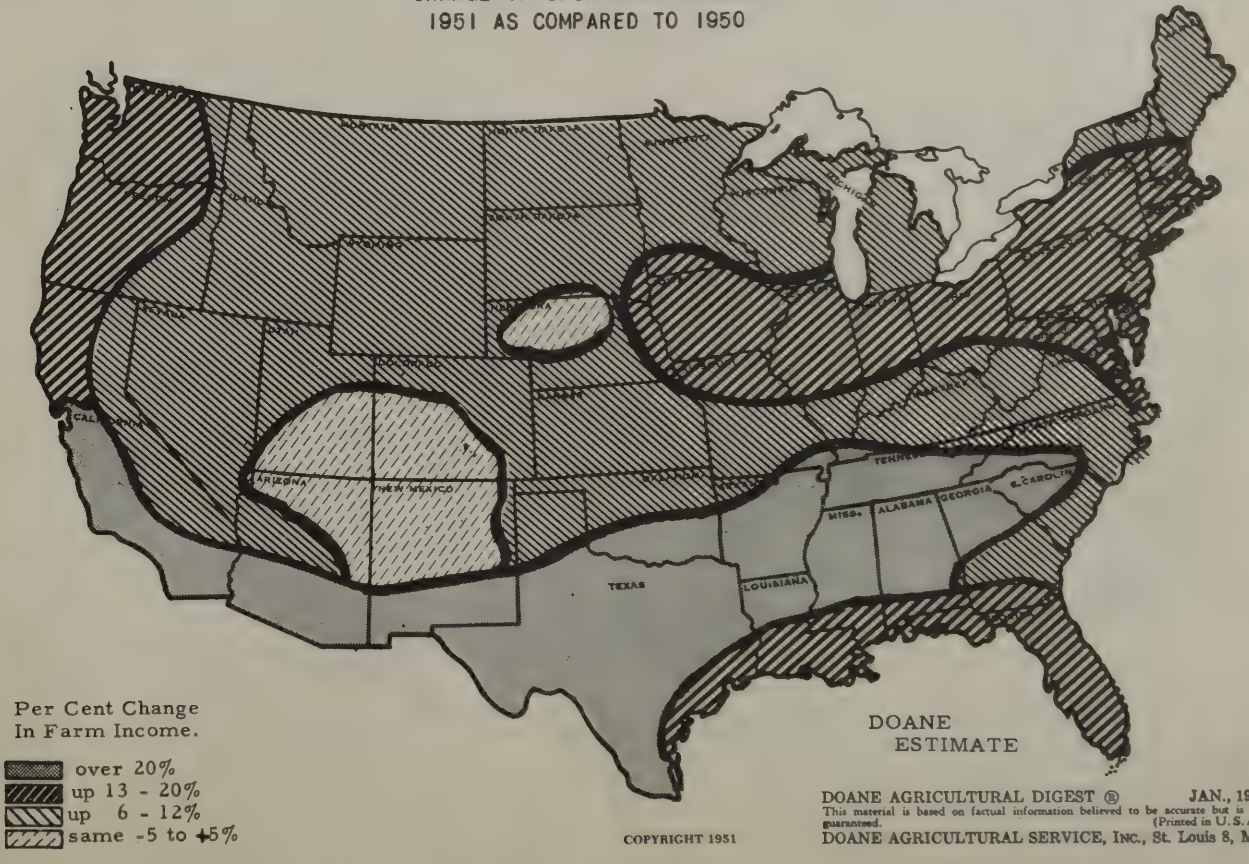
CROP ACREAGE in 1951 will be near 350 million acres -- highest since peak of World War II. We expect increased acreage for: corn, cotton, and wheat. Acreages of soybeans, grain sorghum, peanuts, grasses and legumes, oats, barley, and rye are expected to decline. Tobacco, sugar beets, sugar cane, and potato acreage will be about the same as 1950.

A strong demand for farm products will push most prices above 1950 levels. More city folks are getting higher wages; 53.7 million were employed in November 1950 compared to 51.6 million the year before. Men in the armed forces will eat more food than they did in civilian life. Cotton, wool, fats, oils and grain have become vital war materials.

THE 1951 INCOME SITUATION will likely shape up this way, assuming a growing armament program but no all out war:

CORN -- Acreage allotments will become production goals. Production of 90 million acres at 1950 average yield would make a 1951 crop of 3.3 billion bushels. Support at 90 per cent parity seems certain. Sale price of 1950 corn will continue well above the $1.47 loan level.

CHANGE IN CASH FARM INCOME
1951 AS COMPARED TO 1950



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A LOOK AHEAD AT FARM INCOME

Movement of government corn out of storage at $1.75-$1.80 will be necessary to meet livestock needs before the 1951 crop comes along. Income from sale of cash corn will be up at least 20 per cent.

WHEAT -- Overplanted allotments will boost 1951 acreage to 75 million. Support will be 90 per cent of parity -- $2.15 by next summer. Demand for export will keep prices high. Average yields would produce a 1.27 billion bushel crop, highest since 1948. This would increase income by 50 million dollars.

COTTON -- Production goal is 16 million bales to make up for short crop of 9.88 million bales in 1950. Would require 29 million acres to meet goal at average yields -- only 19 million acres planted in 1950. With favorable weather and insect control, the goal could be made. Prices from 30-40 cents likely. Cotton farmers would have about $600 million more income from cotton in 1951.

Six million more bales of cotton would increase cottonseed supply by nearly 2½ million tons, and would add another $100 million to income.

SOYBEANS -- Record 1950 crop of 281 million bushels was produced on 12.9 million acres. We expect at least one million fewer acres next year. Loss of income will be offset by higher income from other crop and livestock enterprises.

PEANUTS -- Allotment of 1,771,117 acres is 16 per cent less than 1950. Producers voted in December to decide on marketing quotas for next 3 years. Decreased production will cut income.

HOGS -- Hog slaughter for 1951 is estimated at 84.9 million compared to 80.6 million in 1950. This will make about $170 million more gross income for hog farmers in 1951.

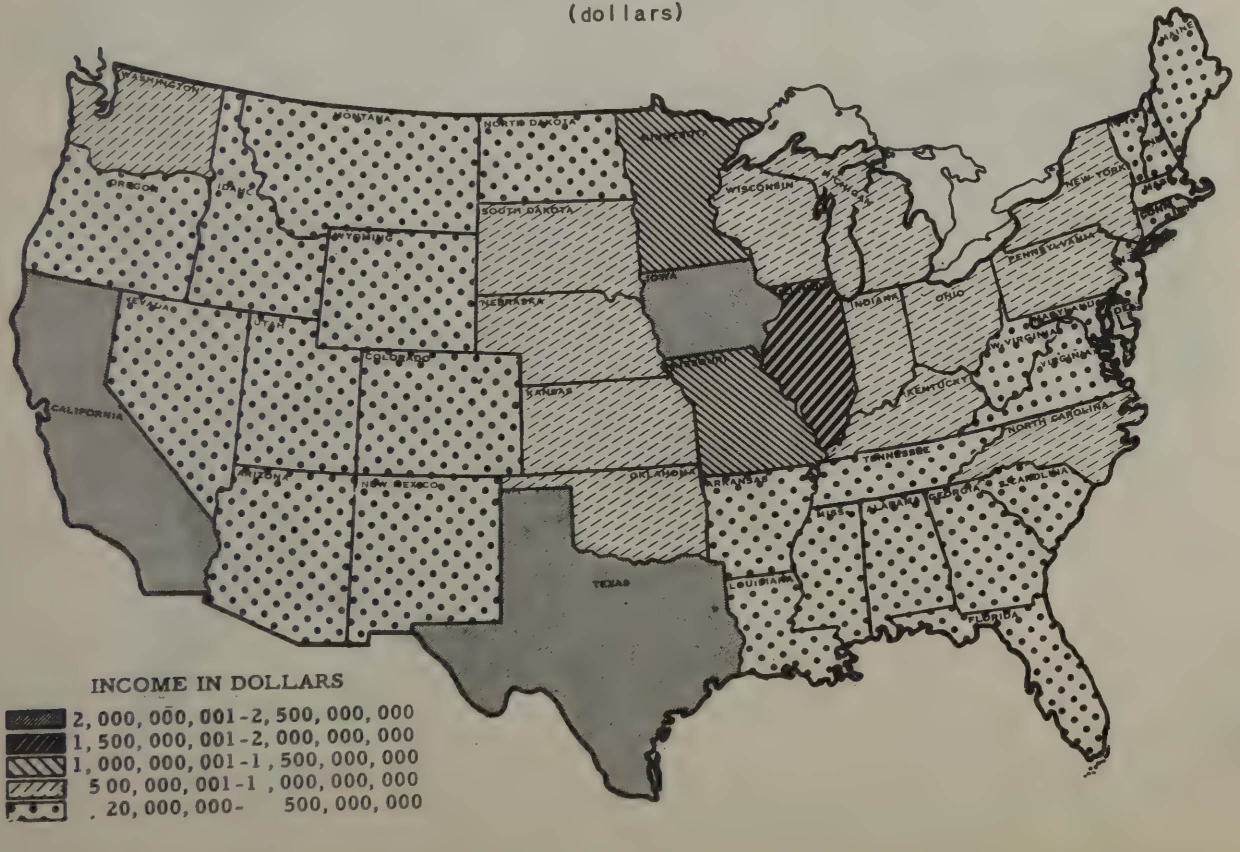
BEEF CATTLE -- More slaughter will increase income slightly in 1951. Income will be lower in those areas where drouth forced cattle liquidation in 1950. Higher income is expected in northern range areas where excellent pastures have kept herds expanding. Corn Belt feeding margins will be down.

SHEEP AND WOOL -- Total slaughter of 13.5 million head will remain about the same in 1951. But 3-4 cents more per pound will bring some increased income from sheep and lambs. Estimated 1951 shorn wool clip is 210-215 million pounds compared to 218 million in 1950. Income from wool will be up about $60 million because wool prices will average 30-35 cents per pound above 1950.

DAIRY -- Milk production will remain near 1950 production of 121 billion pounds. Average over all price increases of at least 7 per cent are expected -- would mean 345 million dollars more income for dairy farmers. Farmers who sell fluid milk will benefit more than those selling cream or milk for manufacturing use.

POULTRY AND EGGS -- A strong demand will easily pull prices up 5-10 per cent above 1950 -- will raise poultrymen's income by at least 100 million dollars. Increased broiler production is expected to raise income by 6-10 per cent. End of egg price supports will not hurt many farmers.

ESTIMATED CASH FARM INCOME
1950
(dollars)



A LOOK AHEAD AT FARM INCOME

What do the next 6 months hold for cash farm income -- for crop prices and livestock prices?

There is only one thing that you can be reasonably certain of. That is lower farm income and lower prices.

HOW MUCH LOWER will depend on such things as:
- How much unemployment increases.
- How far earnings of factory workers drop.
- Government actions.
- Effect of weather on crops and pastures.
- Whether we continue to "butt heads" with Russia.

Most forecasts place gross farm income the last half of this year at 10 per cent or more below the last 6 months of 1948.

HERE'S THE WAY IT LOOKS NOW —
(Compared to Last Year)

WHEAT -- Support price lower -- crop slightly larger. Much wheat will sell under loan rate. Wheat farmers' income down 10 to 15 per cent.

CORN -- Loan price about 6 per cent lower. Much of crop will sell below supports due to lack of storage. If crop is 3.3 billion bushels or over, income will be down 13 to 17 per cent.

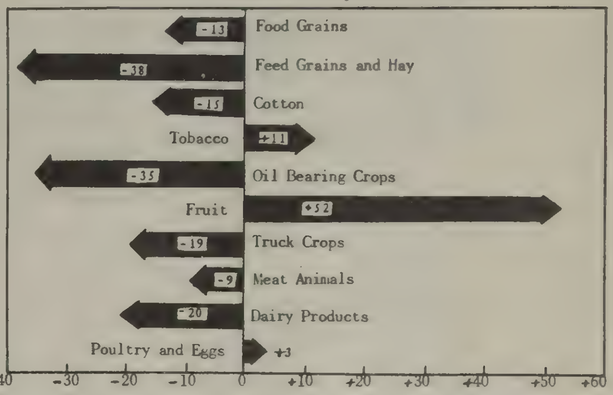
COTTON -- Most expected to go into loan. Price will be 8 to 12 per cent lower than last fall. If crop reaches 16 million bales as some estimate, income will be down about 5 per cent.

TOBACCO -- Price is expected to be 4 to 6 per cent lower than last fall. Production may be down some. Income estimated 10 per cent lower.

SOYBEANS -- Support price down an estimated 6 per cent. Income may be down 10 per cent or more.

BEEF CATTLE -- Gross income expected to drop sharply if business slump continues. May be down 15 per cent or more. Contract prices for feeder steers are now quoted as much as a third lower than same time year ago.

PERCENTAGE CHANGE -- PRICES RECEIVED BY FARMERS
MAY 15, 1948 to MAY 15, 1949
(Based on group indices of prices)



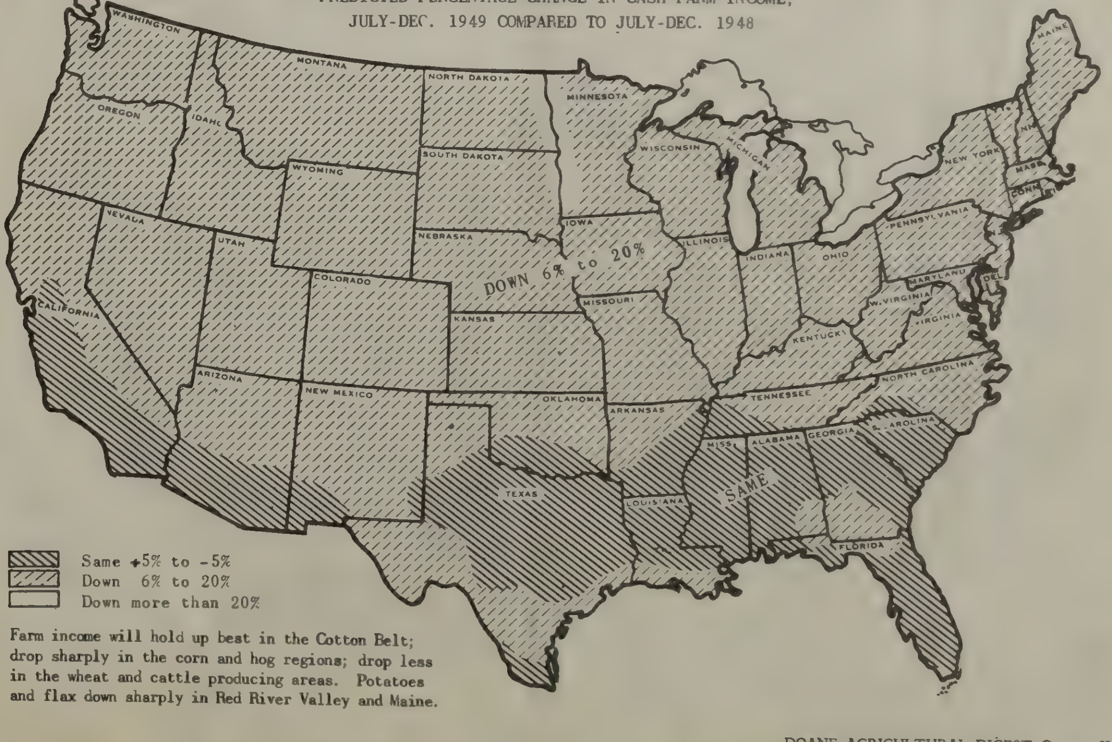
Crop prices are much lower than a year ago, especially feed grains and hay, and oil bearing crops.

HOGS -- Price much below last fall. Expected to drop to support levels of around $14.50 to $15 by December. Price drop will be partly offset by more hogs. Income down 20 per cent or more.

DAIRY -- Prices lower. Income will be down.

POULTRY -- Production up, but prices down more.

PREDICTED PERCENTAGE CHANGE IN CASH FARM INCOME, JULY-DEC. 1949 COMPARED TO JULY-DEC. 1948



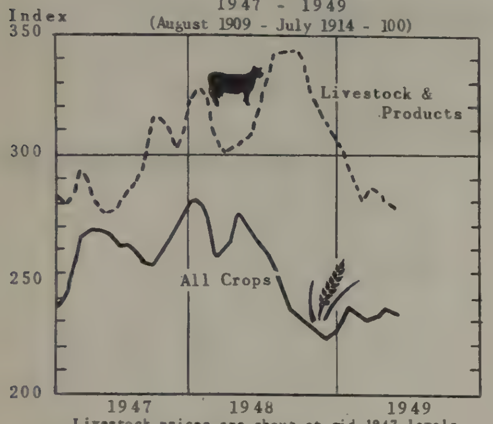
Farm income will hold up best in the Cotton Belt; drop sharply in the corn and hog regions; drop less in the wheat and cattle producing areas. Potatoes and flax down sharply in Red River Valley and Maine.

WHAT YOU CAN DO

You can't do much about prices dropping, or the government support programs or the weather. They are outside the farm fences.

But you can do something about the farm management and marketing practices on your farm. Here are some of the things that should help hold up your farm income in the months ahead.

Indices of Prices Received by Farmers--
All Crops and Livestock and Products
1947 - 1949
(August 1909 - July 1914 - 100)



Livestock prices are about at mid-1947 levels.
Crop prices are sharply lower.

1. Take advantage of government price supports. On many commodities the loan rate will be the top price. Sell to the government if possible.

2. Stay within regulations on commodities having acreage allotments and marketing quotas -- whether you like the rules or not. The fines for producing over your quota will be severe.

3. Watch production costs. Look for cheaper or faster ways of getting jobs done. Don't cut on such things as fertilizer that make you money.

4. Buy cheap and sell dear. Shop around when buying supplies. The scarcity days are about over.

5. Buy feed at the seasons when the price is lowest. Buy oats and wheat in the summer; corn, soybean meal and cottonseed meal in the fall. Keep feed inventories in line with needs.

6. Sell at harvest unless you are storing under the government loan programs. It seldom pays to hold when the general price level is on down-grade.

7. Sell hay from field at harvest. Avoids shrink and reduces handling costs.

8. Buy seeds, especially grass and legume seeds, at harvest time. Price should be lowest then.

9. Follow short-turn feeding programs -- or else get light, good quality cattle to hold down the cost -- winter cheaply and feed on summer pasture.

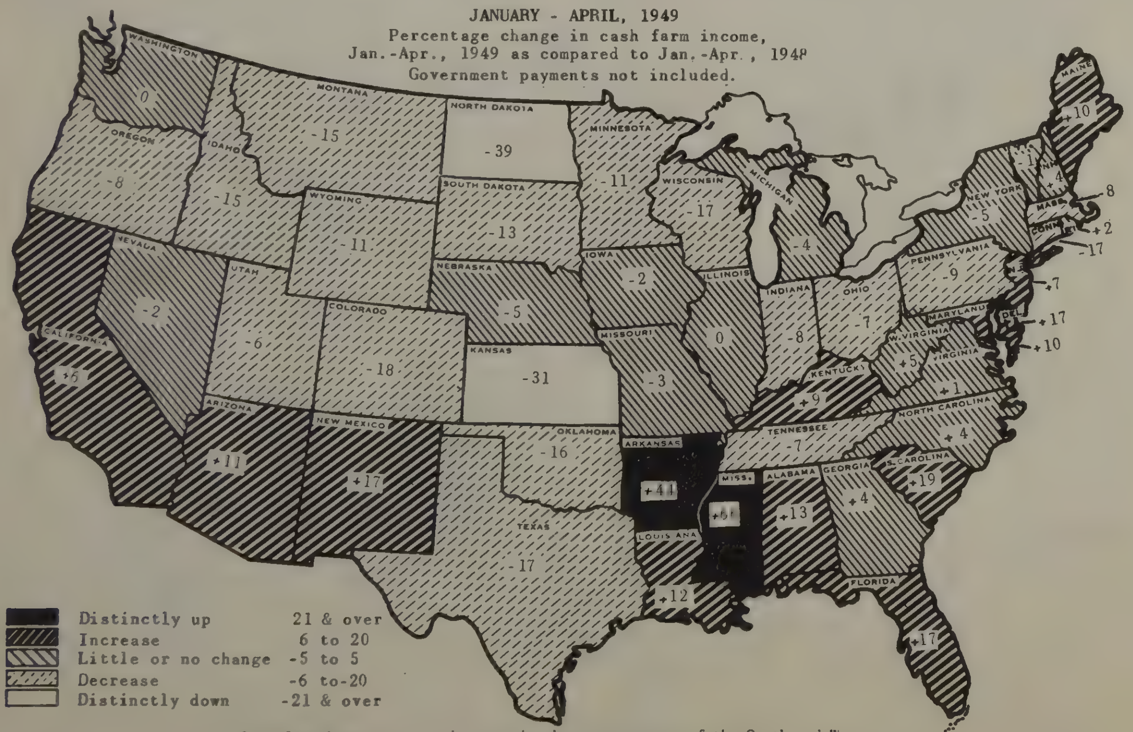
10. A cow and calf operation looks pretty safe for most farmers.

11. Produce more pigs. Profit is guaranteed through March, 1950 by the government support price. Corn-hog ratio will remain favorable.

12. Use fertilizer and lime liberally where needed. They should still be very profitable.

13. Dairy herds should be changed over to fall freshening as soon as possible. Produce more milk in the fall and winter months when the price is highest.

14. Pay off debts. Less bushels of wheat and corn, less bales of cotton, and fewer hogs and cattle are needed now than will be needed later.

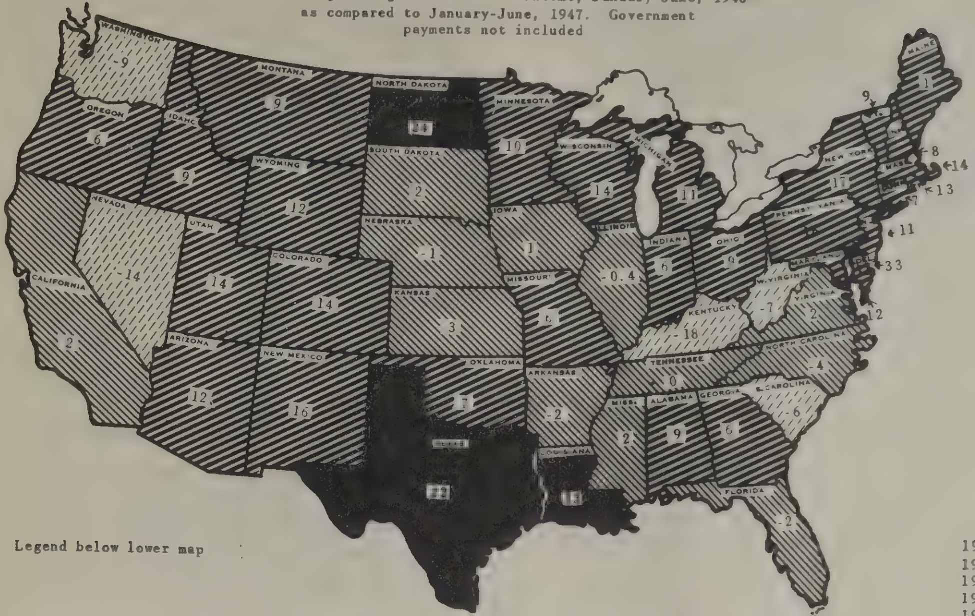

JANUARY - APRIL, 1949
Percentage change in cash farm income,
Jan.-Apr., 1949 as compared to Jan.-Apr., 1948
Government payments not included.

Cash farm income was up the most in the cotton areas of the South and West, resulting from the cotton loan program.

FARM INCOME

JANUARY-JUNE, 1948

Percentage Change in cash farm income, January-June, 1948 as compared to January-June, 1947. Government payments not included



Legend below lower map

U.S. TOTALS

Percentage Increase

First six months of
1947 as compared with 1946

First six months of
1948 as compared with 1947

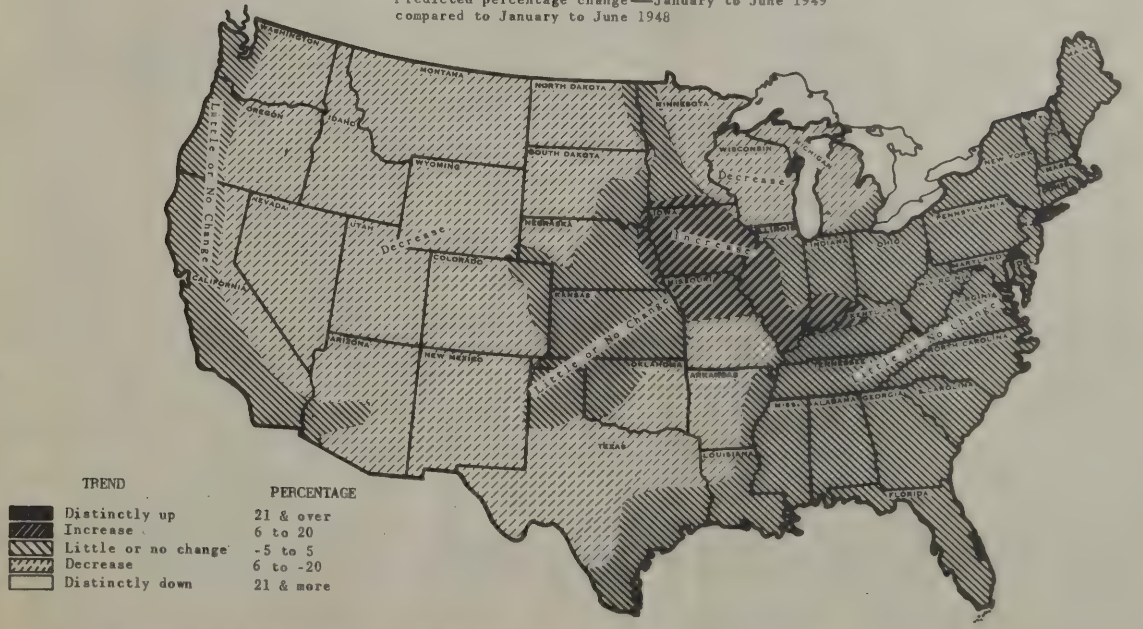
CASH FARM INCOME,
INCLUDING GOVERNMENT PAYMENTS
(In 1000 Dollars)

Year	Income	Remark
1948*	30,000,000	
1947	30,500,112	(Highest on record)
1946	25,635,645	
1945	22,286,000	
1944	21,175,000	
1940	9,132,000	(First Full War Year)
1932	4 743,000	(Depression Low)
1919	14,602,000	(High World War I)

* Estimate

JANUARY-JUNE, 1949 FORECAST

Cash Farm Income Outlook for the next six months
Predicted percentage change——January to June 1949 compared to January to June 1948



TREND		PERCENTAGE
■	Distinctly up	21 & over
▨	Increase	6 to 20
▧	Little or no change	-5 to 5
▨	Decrease	6 to -20
☐	Distinctly down	21 & more

This map shows the probable trend of cash farm income for the first six months of 1949 as compared to the corresponding period last year.

In the range area, the spring wheat belt and the drouth area of the Northcentral states, income will drop. Throughout the East, the greater part of the Middlewest and the West coast, farm income will remain approximately the same.

Farm income increased rapidly during the war years but appears to have reached a peak corresponding to 1919-1920 last year. Poor managers have made money in the past six years, but good farm management will become increasingly important in 1949. Gross farm incomes will continue high next year, but net income will be lower than in 1947 and 1948.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

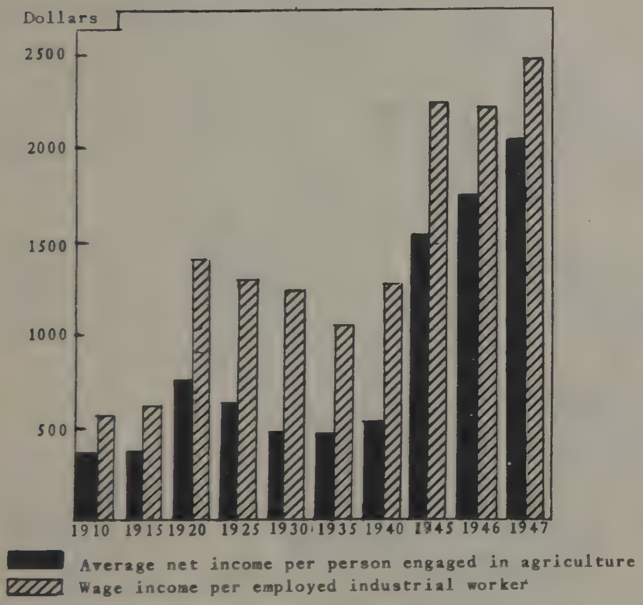
AVERAGE FARM INCOME AND PRODUCTION

INCOME PER WORKER

Average net income per farmer has made rapid gains in the last ten years. In 1942, for the first time on record, the average farmer received more than 1000 dollars in net income for a year's work. In 1947 his average income passed 2000 dollars, only 500 dollars less than the average wage of an employed industrial worker. These figures, compared with those of 1932 when the farmer's average net income was only 218 dollars and the industrial worker received 929 dollars, show the rapid gains farmers have made.

The chart below shows the actual income of both farmers and industrial workers from 1910 through 1947.

AVERAGE INCOME OF AGRICULTURAL
AND INDUSTRIAL WORKERS,
UNITED STATES, 1910-1947

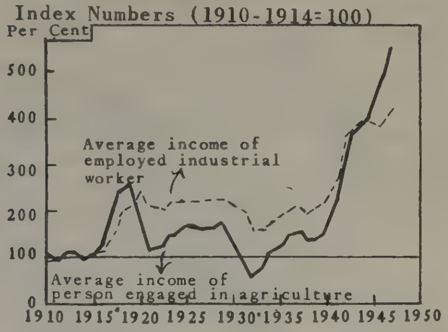


SOURCE: USDA, BAE

Using 1910 to 1914 as equal to 100, the average income of farm workers since 1940 has increased more rapidly and to a greater extent than that of industrial workers. By 1947 average farm income had increased to 455 per cent over the base period and industrial income had increased 329 per cent -- a difference of 29 per cent.

At the present time, it appears that net income per farm worker has passed the peak but that income of industrial workers is still climbing. Next year the spread between actual incomes of farmers and industrial workers will once more increase.

INDEX OF AVERAGE INCOME OF
AGRICULTURAL AND INDUSTRIAL WORKERS
UNITED STATES, 1910-1947



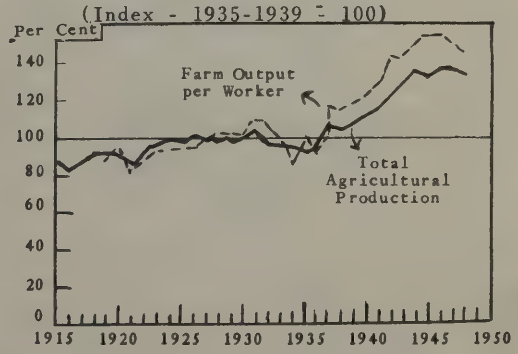
SOURCE: USDA, BAE

PRODUCTION

In agriculture, prices have fallen from record highs; but production remains far above prewar. This is one reason that gross farm income in 1949 will remain approximately the same or only slightly lower than last year.

The high production and high income of the war years have been the result of high prices and good weather, plus better seeds, better livestock and good management. The unequaled demand of the war years gave farmers their first real opportunity to demonstrate the progress that they had made in the past 20 years.

TOTAL AGRICULTURAL PRODUCTION AND
FARM OUTPUT PER WORKER, UNITED STATES
1915-1948



SOURCE: USDA, BAE

Production per farm worker reached a record high in 1946. Farm output per worker is still very high but the trend in the past two years has been downward, even though the number of persons engaged in agriculture is the lowest on record -- only 9,233,000 as of December 1. With a possibility of a return to acreage controls in the next few years, output per worker may drop still farther.

A LOOK AHEAD AT FARM INCOME

Gross farm income in 1950 will probably be about 10 per cent lower than in 1949 and nearly one-fifth lower than the record high of 1948. Net income will be around 15 per cent lower than in 1949 and nearly one-third below the 1947 peak.

The map below shows where these cuts in farm income in 1950 will come. The reductions in gross farm income so far have been due to lower prices. Production has been held high.

Next year, however, the drop in income will be due more to a cut in production than to lower prices. Prices are expected to be held nearly at 1949 levels through the government support program. But, production of the major cash crops will be cut back sharply by government control programs.

The 25 to 30 million acres "controlled" out of various cash crops will not constitute a total loss in income. Most of the acres will be planted to other crops or pasture. However, the cash income from these alternative crops will average less than half what the 1949 crops brought. The land taken out by allotments will also be the poorest land, and this will help ease the effect of the acreage reductions.

We estimate a 2.2 billion dollar drop in gross income from cotton, corn, wheat, peanuts, dairy products, cattle, hogs, and poultry in 1950. This is after allowance is made for income from alternative crops on "controlled" land. These 4 crops and 4 classes of livestock account for approximately two-thirds of the gross farm income. Income from all other crops and livestock products will drop an estimated one billion dollars. Thus the total drop in gross farm income in 1950 will probably be slightly over 3 billion dollars.

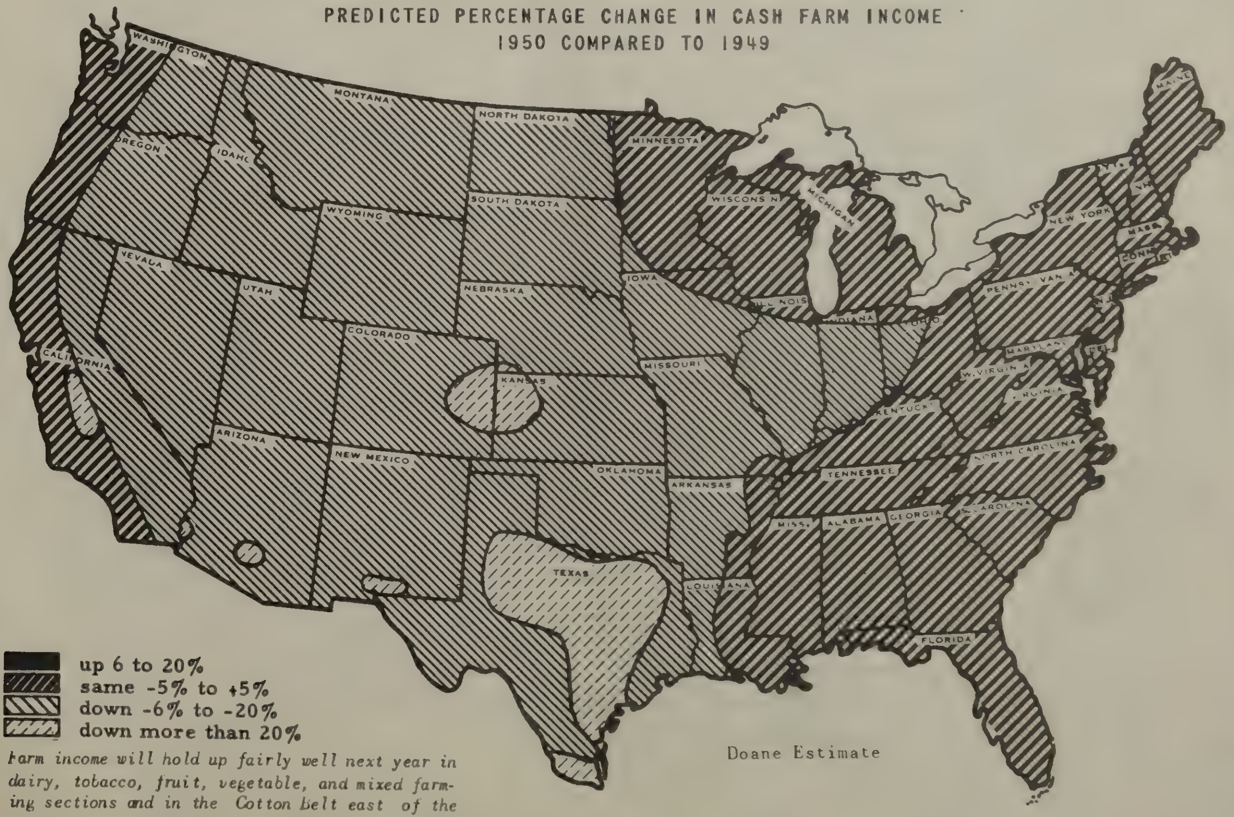
The income situation on the various crops and livestock is likely to shape up about as follows:

COTTON -- Marketing quotas call for a crop of 11,733,750 bales in 1950. This is a cut of 4.3 million bales from the 16 million bale crop of 1949. Result of this production cut will be a drop of 645 million dollars in farmers' cash income from cotton. The support price will be about 1 cent per pound lower in 1950. This will result in a further cut of 58 million dollars in cotton income.

If cotton production is cut by 4.3 million bales, that means a drop in cottonseed production of approximately 1.94 million tons -- worth about 85 million dollars. Thus the total cut in cash farm income from cotton and cottonseed will be about 788 million dollars -- or down nearly one-third from 1949. It is doubtful if one-half of this income can be made up by the use of other crops.

Big share of cotton income cut will be west of the Mississippi River. Income east of the Mississippi should hold near 1949, provided the severe boll weevil losses of 1949 are not repeated.

PREDICTED PERCENTAGE CHANGE IN CASH FARM INCOME
1950 COMPARED TO 1949



Farm income will hold up fairly well next year in dairy, tobacco, fruit, vegetable, and mixed farming sections and in the Cotton Belt east of the Mississippi. Wheat, corn, hog and cattle areas and Southwest will get cut.

Doane Estimate

A LOOK AHEAD AT FARM INCOME

CORN -- Acreage allotments may call for a cut of near 10 million acres in the Corn Belt. Actual acreage cut may only amount to around 6 million acres. A 6 million acre cut will probably reduce production by 240 million bushels. This size production cut will likely drop corn income by 300 million dollars. Perhaps one-half this drop can be made up by planting soybeans or other crops on the controlled acreage. Lower prices for corn in the fall of 1950 will probably result in a further income drop in the Corn Belt of about 175 million dollars. The total cut in income from corn will probably be 475 million dollars. Some of this decrease won't show up until the spring of 1951.

WHEAT -- [illegible] nts call for a cut in acreage of nearly 12 [illegible] t will actually be nearer 8 millio [illegible] 10 per cent from 1949. [illegible] d by about 88 millio [illegible] llion dollar cu [illegible] rable weathe [illegible] ay be high anc [illegible].

The p [illegible] f "overplant" wheat [illegible] d not be eligible for the s [illegible] e" wheat should sell for 50 cen [illegible] loan rate, there would be an additio [illegible] of approximately 25 million dollars. [illegible] n rate is 8 cents per bushel lower than in 194 , [illegible] re will likely be a further loss of 88 million dollars. Altogether this makes a total of approximately 276 million dollars less than farmers will get from wheat in 1950.

PEANUTS -- Acreage for 1950 will be reduced by another one-half million acres -- a cut of nearly 20 per cent from 1949. This cut will likely result in a drop in production of 175,000 tons -- worth around 35 million dollars. A probable drop of 0.4 cents a pound in the support price will cut income by another 6 million dollars. This makes a total cut of over 40 million dollars in peanut farmers' income. Planting of corn, soybeans, pasture, etc. may make up 15 to 20 million dollars of this in 1950.

DAIRY -- Income of dairy farmers is likely to be down only 3 to 5 per cent. Prices will be lower but increased production will prevent a further drop. A 3 to 5 per cent cut means around 150 to 200 million dollars. Dairy products account for about 15 per cent of total cash farm receipts.

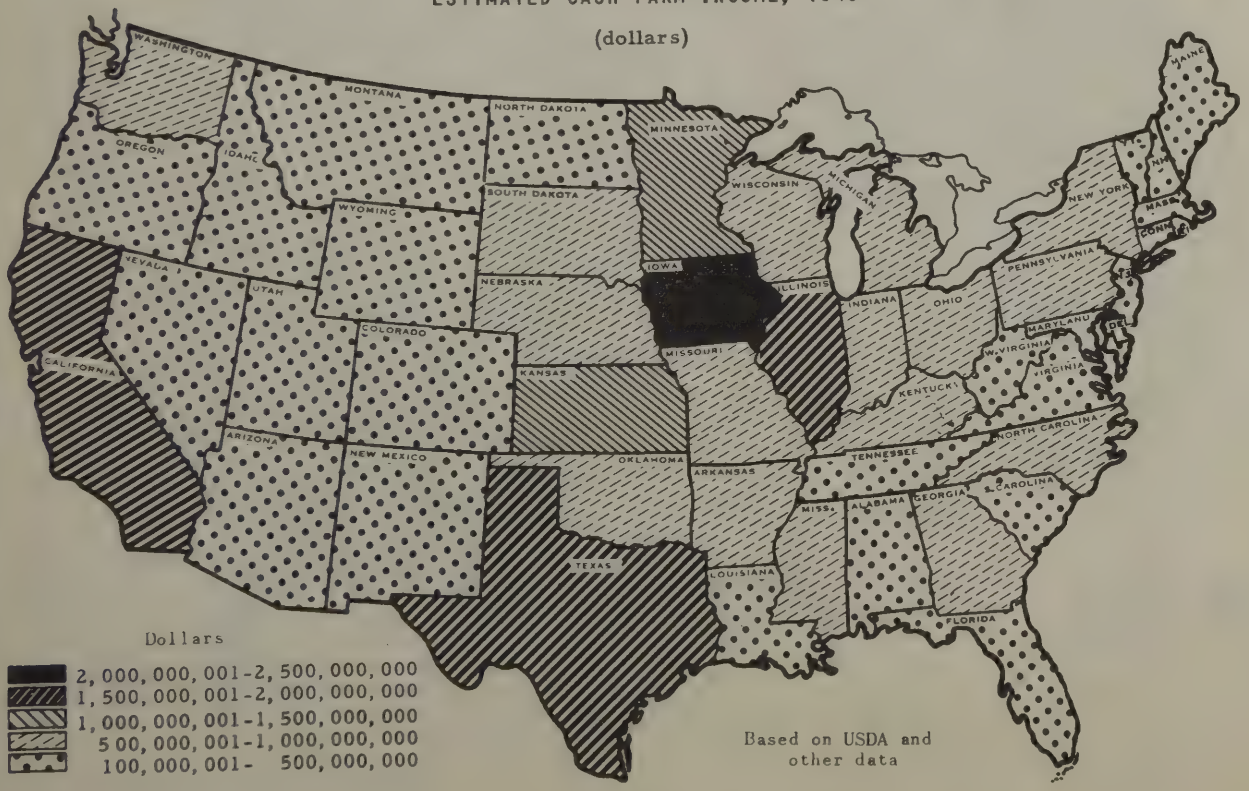
CATTLE -- Lower prices will bring down farmers' and ranchers' income. Income may be down 10 per cent -- which would mean a drop of about 500 million dollars in sales of cattle and calves.

HOGS -- Increase in production of 8 to 10 per cent -- or roughly 7-1/2 million pigs -- should nearly offset the lower prices expected. Allowing for the increase in production, a drop of $2.00 per hundred in hog prices in 1950 will mean a cut in gross income from hogs of about 148 million dollars.

CHICKENS and EGGS -- Income from chickens may hold about steady, with greater marketings offsetting any price drops. Income from eggs is likely to be down by 150 to 175 million dollars. Lower prices will not be balanced by increased production.

ESTIMATED CASH FARM INCOME, 1949

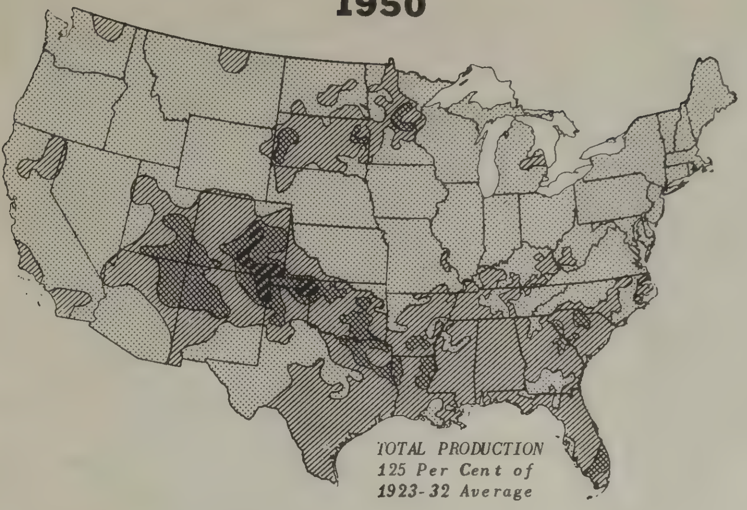
(dollars)



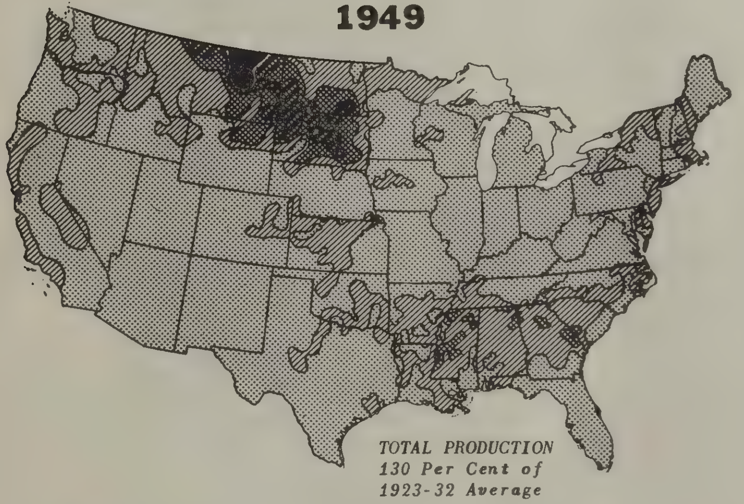
Based on USDA and other data

CROP YIELDS

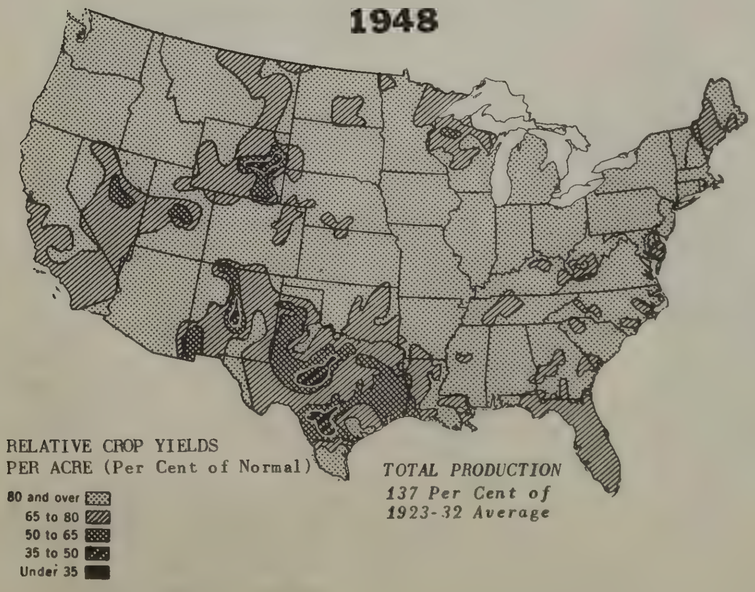
1950



1949



1948



RELATIVE CROP YIELDS
PER ACRE (Per Cent of Normal)

- 80 and over ░
- 65 to 80 ▨
- 50 to 65 ▦
- 35 to 50 ▩
- Under 35 ■

Based on Data of U.S.D.A.

Conditions of late maturing crops improved during October. The 1950 index of crop production was 125 per cent of the 1923-32 base. This was the fourth largest crop of record, exceeded only in 1946, 1948, and 1949.

Wheat and flaxseed yields were slightly below average, but higher than in 1949. Most others were above average and above last year, with cotton yield below last year. New high yields were reported for rice, grain sorghum and potatoes, with yields of barley, all hay, soybeans, peanuts, tobacco, sweet potatoes and sugar beets second highest of record.

CORN production was estimated at 3,105 million bushels -- a drop of 8 per cent from last year's crop, but 7 per cent above the 1939-1948 average. The indicated yield per acre of 37.4 bushels was 1.5 bushels below last year, but 4.5 bushels above the ten-year average. The WHEAT crop again exceeded one billion bushels, but was 12 per cent below 1949. The average yield was 16.7 bushels per acre -- 1.8 bushels more than last year.

GRAIN SORGHUM production reached a record level -- 6 per cent above the previous record in 1944. The estimate was 196.3 million bushels with a yield of 23.5 bushels per acre. The SOYBEAN crop was also largest of record -- 281 million bushels, 27 per cent above last year's near record crop and 71 per cent above the 10-year average. Average yield was 21.7 bushels per acre -- slightly lower than last year's record high yield. Production of PEANUTS was estimated at 1,771 million pounds -- 6 per cent less than 1949 and 9 per cent less than the 10-year average.

TOBACCO production of 2,013 million pounds was 2 per cent above the 1949 production figure. The increase was in the flue-cured crop -- both burley and dark fire-cured production was below a year ago. The RICE crop was estimated at 28,022,000 equivalent 100 pound bags -- 5 per cent less than the record 1949 harvest. A record yield of 2,366 pounds per acre was harvested.

The COTTON crop was estimated at 9,945,000 bales -- 38 per cent below the 1949 production and 22 per cent below the 10-year average. Average yield was 259 pounds per acre -- 9 per cent below last year.

POTATO yield of 236 bushels per acre topped the previous record in 1948 by 20 bushels. The 430,591,000 bushel crop was 7 per cent larger than both the 1949 crop and the 10-year average. The SWEET POTATO crop of 59,491,000 bushels was 10 per cent larger than last year but 4 per cent below average.

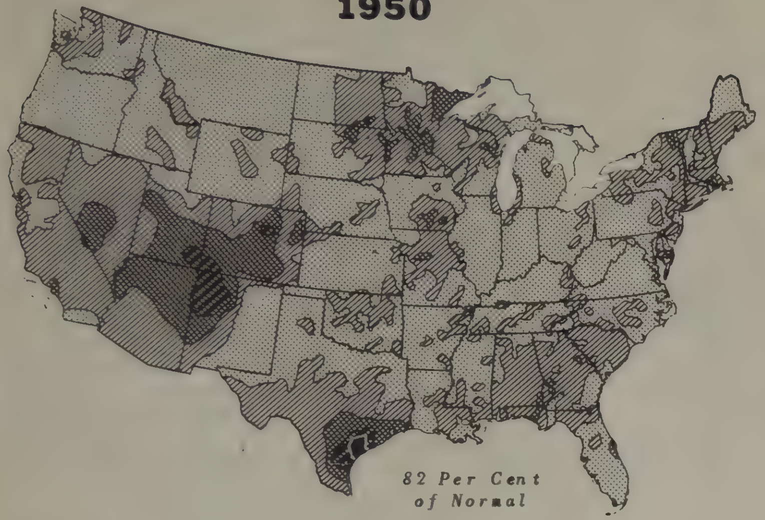
APPLE crop was ten per cent below last year, with 120,499,000 bushels indicated for 1950. The 1950 GRAPE crop totaled 2,538,900 tons. The California crop was the lowest since 1942. PEAR production was down to 30,804,000 bushels -- 5.5 million bushels below 1949.

SUGAR CANE production was 7,260,000 tons, compared with the 6,796,000 ton crop last year and the 10-year average of 5,915,000 tons. The 1950 SUGAR BEET crop was 8 per cent above the previous record crop of 1947.

PASTURE CONDITIONS

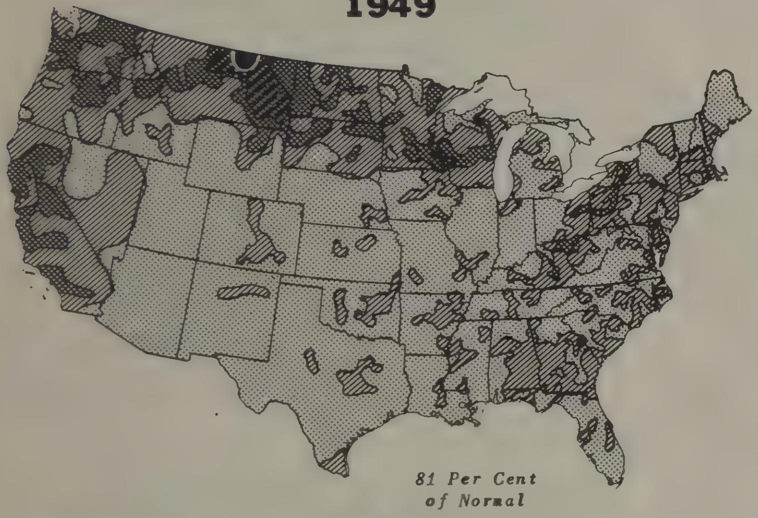
NOVEMBER 1

1950



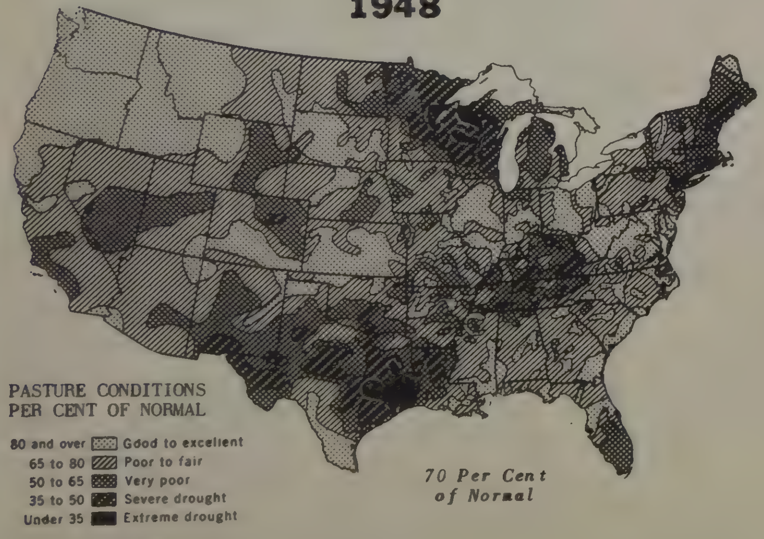
82 Per Cent of Normal

1949



81 Per Cent of Normal

1948



70 Per Cent of Normal

Based on USDA Data

Hay and roughage supplies on farms are larger than average. They appear to be lower than usual in Colorado and New Mexico. Fall and winter grazing was good in most areas on November 1 but pastures were dry in the extreme southern and coastal counties of Texas, and in the southern Rockies.

Pastures on June 1 were in average condition. Condition was poorest in dry portions of the Southwest and southern Mountain states. Some cattle were shipped out of this area. Pastures were poorest on record in New Mexico, second lowest in Colorado, and were below average in most of the Rocky Mountain area. Range pasture conditions improved more than usual through the spring months but still were below average.

Pastures were furnishing about average grazing on July 1, with poor pastures limited largely to the dry areas of some southeastern and Great Plains states. Western range pastures varied from very poor to fair in the southern Mountain and far Southwestern states, but were good in Texas, Oklahoma, northern range states and California. Livestock, except in the dry, short feed areas, were in good condition and made good gains.

August 1 pasture condition was reported equal to that in 1945, which was the highest for the date in 35 years. Excellent grazing was available over most of the country, although only fair in parts of New England, New York, New Jersey, Minnesota, South Dakota, and Pacific Coast states, and relatively poor in Colorado. Range pastures improved greatly in July, leaving poor grazing only in south Texas, parts of New Mexico, Arizona, Colorado and lower ranges that are seasonally dry.

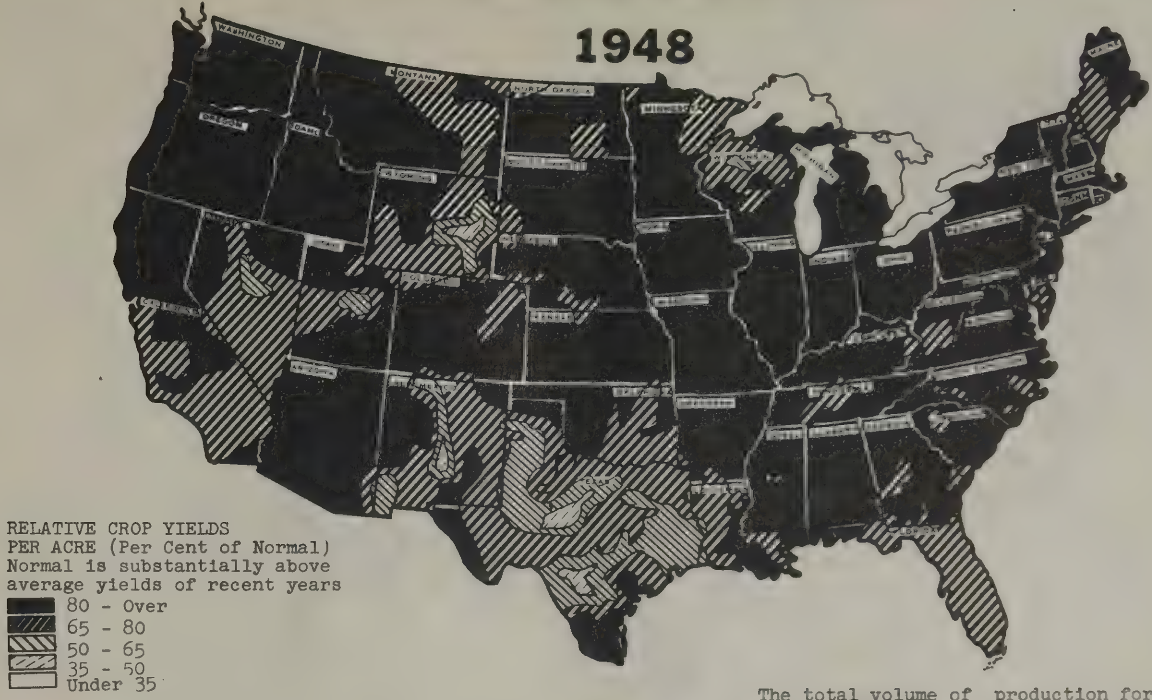
Excellent grazing conditions continued through August. Rains in late August and early September in dry areas improved pastures that were only fair before. Range pastures also had a good supply of feed, except in scattered dry portions of the Great Plains and southern Mountain states.

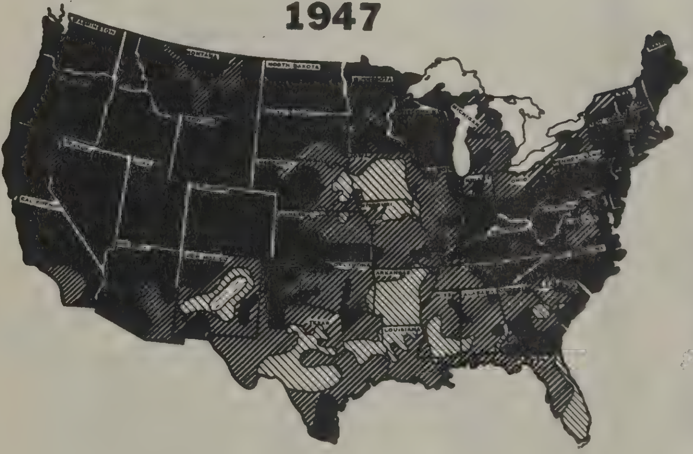
Pastures on October 1 were furnishing more than the usual amounts of feed. With the exception of 1915 and 1942, October 1 condition was the best in 36 years of record. Pastures were reported poor and dry in Minnesota and portions of adjacent states. They were poor to fair in New England, South Carolina, Georgia and scattered Gulf Coast sections, southern Rocky Mountain areas and the Pacific Northwest. In other states, the condition was good.

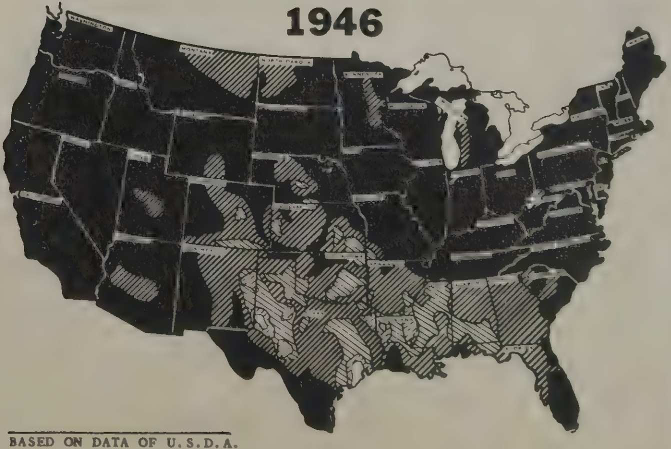
Pastures continued good through early fall. In the Southeast and southern Rocky Mountain states pastures were short. Wheat pastures were available in the central and southern Great Plains, but grazing was being restricted in Nebraska and Kansas. Dry weather had caused loose soils and livestock were pulling up the poorly rooted plants. Range pastures were mostly good, though short and dry in much of the southern Mountain area from southern Texas, western New Mexico and southern Colorado westward to southern California.

Throughout the South the condition of pasture on November 1 was better than average, but in many states was not as good as last month or last year. Pastures and ranges in southern Texas dried up sharply during October due to lack of rainfall.

CROP YIELDS







BASED ON DATA OF U.S.D.A.

The total volume of production for all crops in 1948 is 137 per cent of the 1923-32 pre-drouth base. This is 11 points above the previous high mark set in 1946. Feed grains and oilseeds were produced in record volume, food grains are second only to last year's record and truck crops and fruits are well above average quantity.

For most commodities, yields per acre in 1948 are above average. Principal crops with below average yields are rice, dry peas and peanuts. Corn, cotton, soybeans, potatoes and dry beans are all estimated to have the highest yields on record.

Considering individual crops, corn led the way with a record production of 3,650 million bushels. This is about 1½ times last year's small crop and 12 per cent more than the previous record crop in 1946. Wheat, which provides the bulk of our food grain, turned in a production of 1,284 million bushels, 81 million bushels less than last year.

Total oilseed production was larger than in 1947. Soybean production was 16 per cent greater than a year ago and flaxseed increased 26 per cent.

Total hay production is estimated to be 3 million tons less than in 1947 but nearly 2 million tons more than the 10-year average.

Cotton production increased 28 per cent over last year. Indicated yield is 312 pounds per acre, as compared to 267 last year and a 10-year average of 254 pounds.

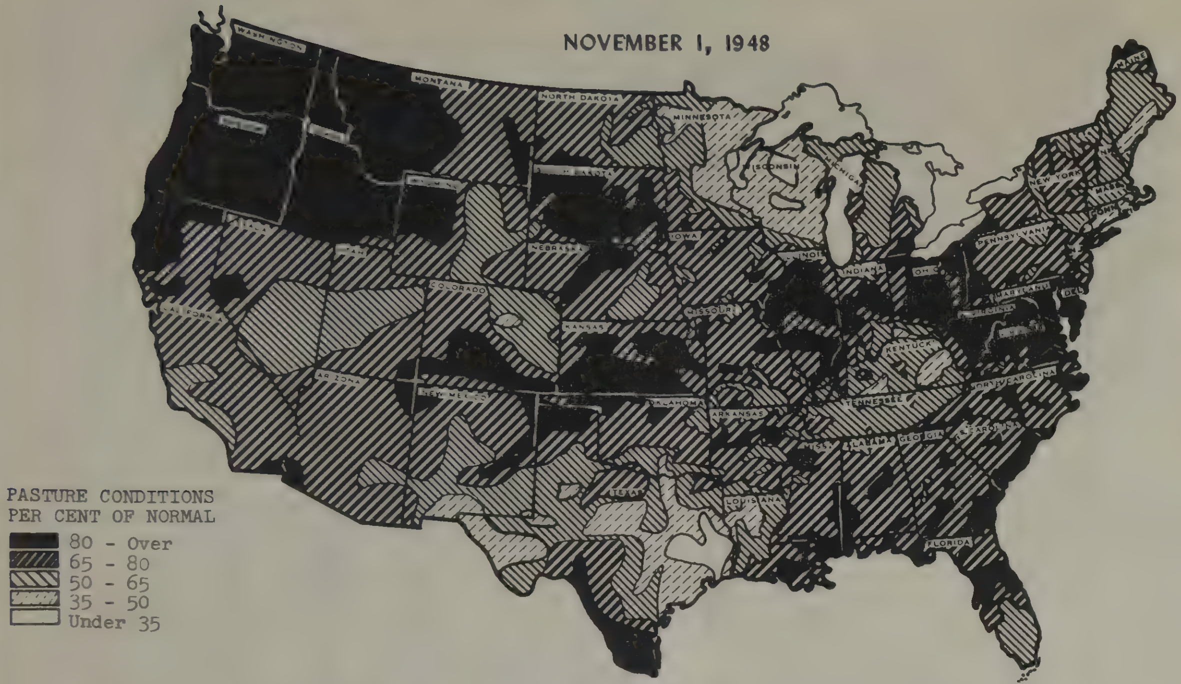
Tobacco production dropped 236 million pounds from the large 1947 crop, a decline of 11 per cent. This reduction is entirely the result of reduced acreage quotas -- yield is up 7 per cent.

The large potato production this year is exceeded only by the record crop in 1946 and the near record crop in 1943. The 204 bushel per acre yield is 18 bushels above the previous high.

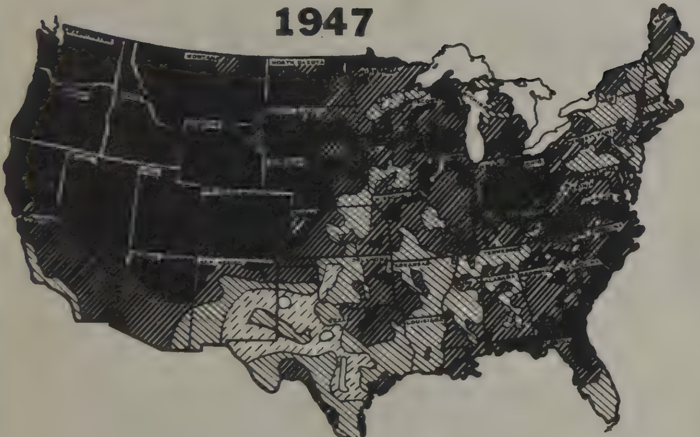
Production of 23 legume and grass seeds is one-fourth less than in 1947. Estimated deciduous fruit production is 13 per cent less than last season and 6 per cent less than average. Citrus production is indicated about the same as the large total last season. 1948 production of 8 commercial truck crops is estimated to be about 10 per cent less than 1947, 6 per cent above average.

PASTURE CONDITIONS

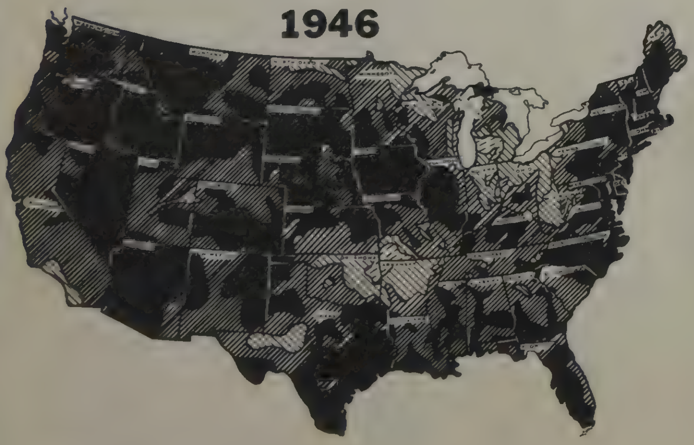
NOVEMBER 1, 1948



1947



1946



In most sections of the country, pastures have furnished about average amounts of feed in 1948.

For the country as a whole, pastures had a better than average start, but by June 1 reserve supplies in dry areas were less plentiful than usual. Pastures were closely grazed in many central, southern and southwestern areas during the summer. Dry June weather in these areas held back growth of grass and other pasture crops. In Ohio and Michigan, pastures were furnishing above average feed, but in Wisconsin and Minnesota, pastures were very drouthy.

On September 1, farm pastures were furnishing good feed in most parts of the country, with conditions averaging the third highest for the date in 20 years. Moisture supplies in early August were unusually good and growing conditions generally favorable. However, the late August heat wave and lack of moisture caused sharp declines in pasture conditions in some areas. Pasture feed was seriously short in the western Great Lakes area, in the lower Tennessee Valley, in much of Louisiana and Texas, and in scattered sections of the Western Range area, particularly Wyoming, southwest New Mexico, Nevada and Southern California.

Farm pastures furnished livestock less feed than usual in the late fall months, due to dry weather in many sections. Mid-October frosts nipped late growths further south than usual. November 1 pasture condition averaged 70 per cent of normal, the lowest since 1939. Livestock in the northeastern portion of the country are now mostly shifted to winter rations.

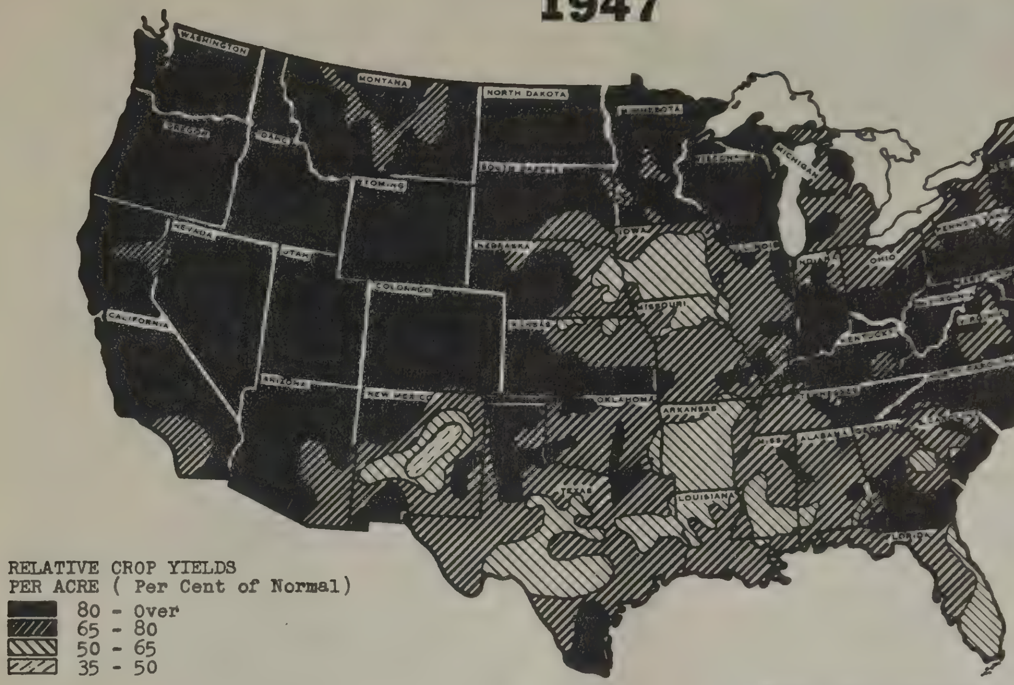
Pastures are an important source of feed throughout the country, but are especially important in western range areas, and in the Great Lakes and Northeastern dairy areas. This year these areas are in poor condition, with the Great Lakes region in a state of severe drouth. These areas will be forced to ship in above-normal amounts of hay and supplements from other areas and some farmers may be forced to liquidate their stock.

BASED ON DATA OF U.S.D.A.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

CROP YIELDS

1947



Total crop production for 1947 was only 1 per cent below the average for the five year period 1942-46, and 5 per cent below the record set last year. Food grain production established a new record high, and the hay, oilseed, fruit and truck crops were all well above average. Feed grain production, however, was below average.

As indicated by the above map, per acre yields of crops were disappointing throughout most of the Corn Belt, the South Central region and Florida; and for spring-planted crops, most of the Southwest. In Western states, yields were well above average, and average or above in other areas.

Considering individual crops, wheat, which provides the bulk of our food grain, turned in a production of 1,365 million bushels, which is more than 450 million bushels above the 10-year average. The corn crop, kingpin of the feed grains, was a fourth smaller than last year, and over 200 million bushels below the ten year average. Production of other feed grain crops was also down from last year, with the exception of barley, which showed a slight gain.

Total oilseed production was larger than in 1946, mainly as a result of increased production of flaxseed and cottonseed. Soybean production was smaller than a year ago as a result of a 20 per cent drop in per-acre yield.

Final estimates place total hay production about 1 million tons above the big 1946 crop. The quality of the crop is inferior to that of 1946, however, because of poor curing weather for the early cuttings of clover and alfalfa.

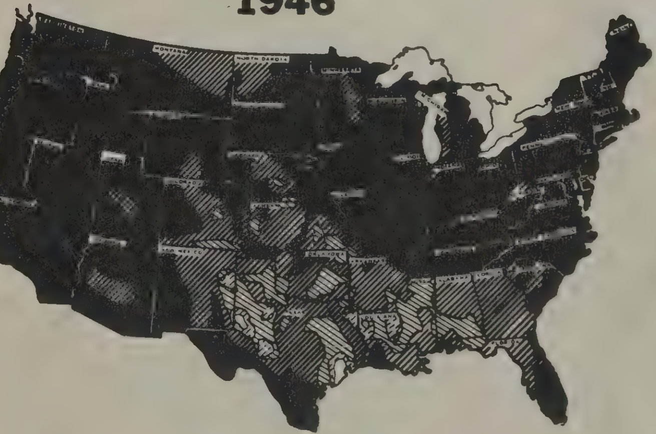
Cotton production was nearly a third larger than the small 1946 crop as a result of an expanded acreage. Indicated yield was placed at 265 pounds per acre, compared with 235 the year before.

Another huge tobacco crop was harvested in 1947 in the wake of a record breaking 1946 crop. Yields for the crop were near record levels.

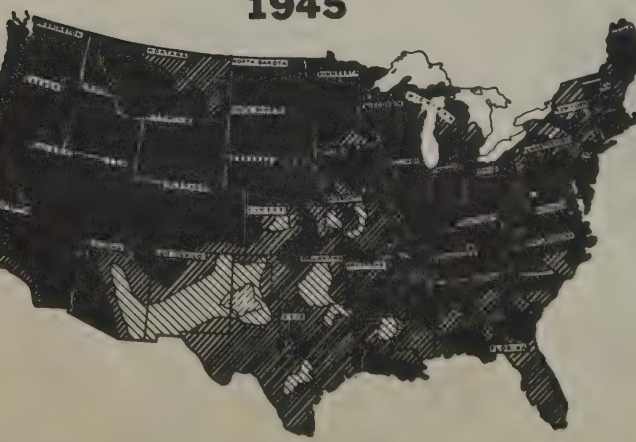
Potato production was 20% smaller than the 1946 crop, but about equal to the 10-year average.

Briefly summarizing other crops, production of 6 major field seeds was 11 per cent below 1946, with the alfalfa, alsike clover, and timothy seed crops above average, and red clover, sweet clover and sudan grass seed crops below average. Fruit production in 1947 was only 4 per cent below 1946 and 20 per cent above average. Citrus production was practically as large as the 1946 record output. Aggregate production of 25 commercial truck crops for 1947 was estimated to be 13 per cent below 1946, but 13 per cent above average.

1946



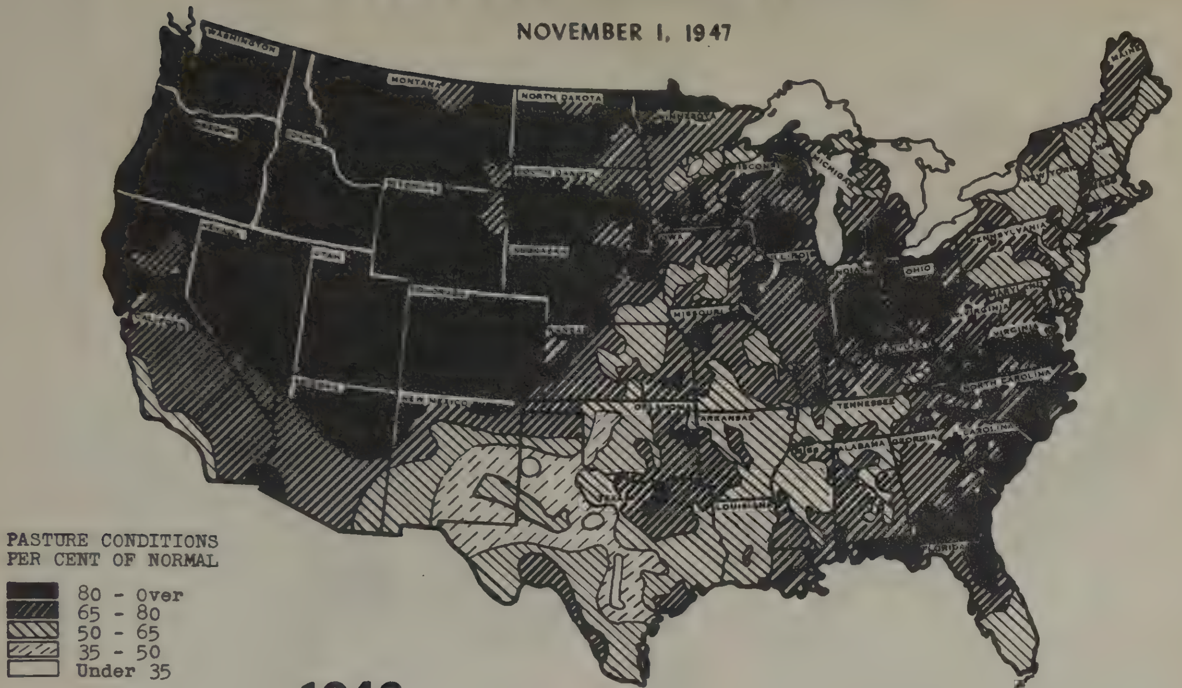
1945



Based on Data of U.S.D.A.

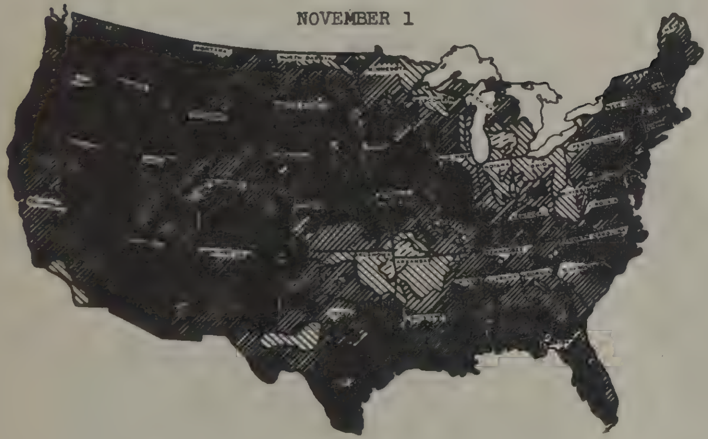
PASTURE CONDITIONS

NOVEMBER 1, 1947



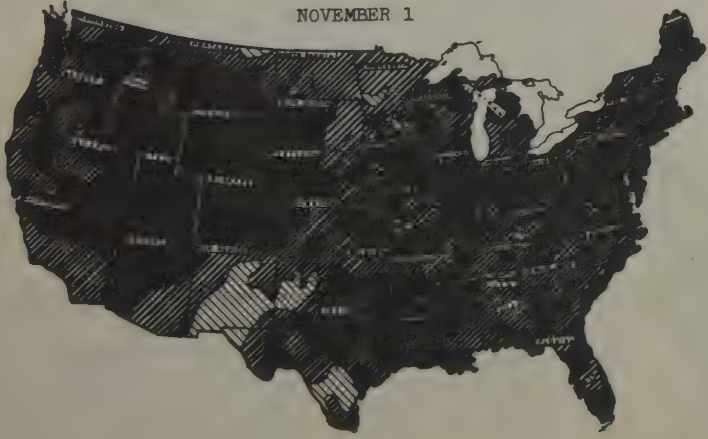
1946

NOVEMBER 1



1945

NOVEMBER 1



For the country as a whole, pastures have furnished well above average amounts of feed during 1947. In most areas, pastures got off to a slow start because of a cool, backward spring. Moisture supplies were generally ample, however, and when warmer weather spread over the country in May, pasture growth responded to give lush grazing in practically every state except New Mexico and Arizona.

Generally, grazing was excellent until August 1, when the effects of extreme hot dry weather began to wither growth through a broad central belt of states. Drouth conditions in this area held until about October and seriously reduced the carrying capacity of pastures in these states. In other areas, and especially in states west of the Rockies, above average grazing conditions continued through the summer and fall.

During the late summer and fall, a serious lack of moisture in the southern Great Plains and the Southwest resulted in a rapid decline in pasture conditions in those areas. Lack of moisture also prevented sprouting of volunteer wheat and delayed or prevented the seeding of winter wheat in those areas. This practically eliminated the wheat pasture, which is normally used to graze large numbers of cattle and sheep during the fall months.

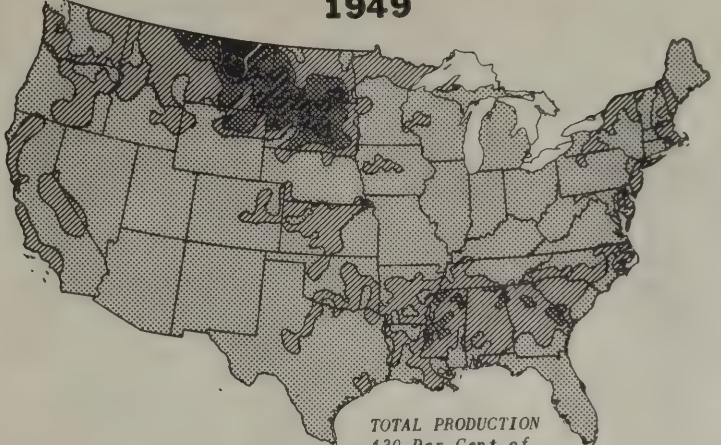
During the late fall months the most favored pasture areas have been the South Atlantic states, an area around the Great Lakes, and the Dakotas, Nebraska, and states to the West, as shown on the above map which is based on November 1 conditions. During November and December, rain and snow throughout the country bolstered moisture supplies in most of the deficit areas and increased moisture reserves in other states.

Pastures are an important source of feed throughout the country, but are especially important in western range areas, and in the Great Lakes and Northeastern dairy areas. Apparently, these areas are in good condition to go through the winter with ample supplies of forage, with the exception of the southwestern Range states. This area, having practically lost out on fall and winter wheat pasture, and with range carrying capacity reduced by the extreme dry weather, will be forced to ship in above-normal amounts of hay and supplements from other areas.

Based on Data of U.S.D.A.

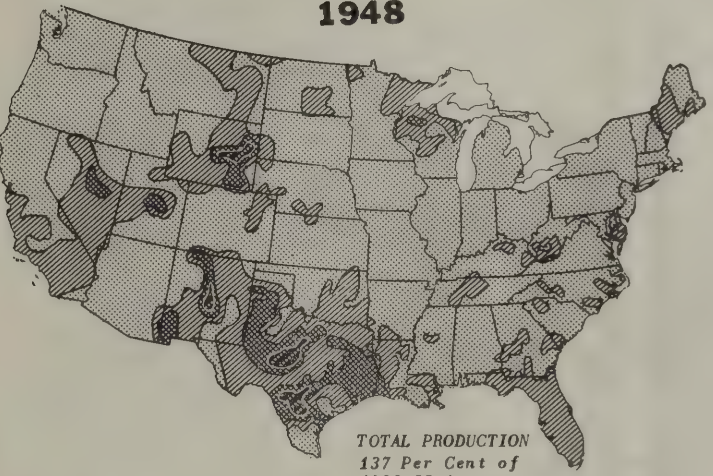
CROP YIELDS

1949



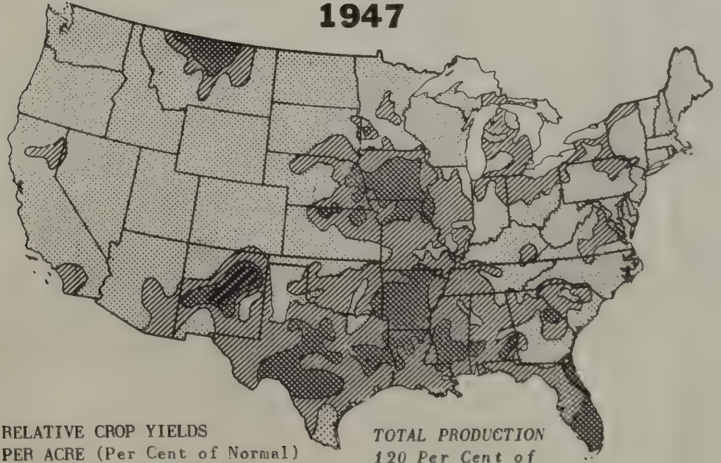
TOTAL PRODUCTION
130 Per Cent of
1923-32 Average

1948



TOTAL PRODUCTION
137 Per Cent of
1923-32 Average

1947



TOTAL PRODUCTION
120 Per Cent of
1923-32 Average

RELATIVE CROP YIELDS
PER ACRE (Per Cent of Normal)

80 and over	░
65 to 80	▨
50 to 65	▩
35 to 50	▦
Under 35	■

Based on Data of U.S.D.A.

Production of crops in 1949 was the second largest on record, falling only a little short of last year's all-time high. Total concentrate feed supply is larger than in any past year and 7 per cent above a year ago.

CORN production in 1949 reached 3 billion, 358 million bushels, which is 8 per cent below last year's record crop, but 20 per cent above average. The U.S. yield per acre is indicated at 39.1 bushels, compared with the record yield of 42.7 bushels in 1948. The WHEAT crop again exceeded one billion bushels -- totaling 1 billion, 126 million bushels at an average yield of 14.9 bushels per acre.

GRAIN SORGHUM production exceeded 1948. Yield was 21.9 bushels per acre, an increase of 3.9 bushels over 1948. The SOYBEAN crop is the second largest on record, falling a little short of last year. Yield is a record, 22.2 bushels per acre. PEANUT production was down 21 per cent as a result of acreage allotments. Yield was up -- averaged 725 pounds per acre.

TOBACCO production is one per cent larger than the 1948 crop. Yield of all types averaged 1233 pounds per acre, a drop of 3 per cent from 1948. The COTTON crop is indicated at 15,524,000 bales, 656 thousand bales above 1948 and the largest crop in 12 years. Yield is estimated at 287.6 pounds of lint per acre. This compares with 313.1 pounds last year. The Texas yield of 261 pounds is the highest since 1894. California had the top yield at 652 pounds.

POTATO yield was 204 bushels per acre, the second highest of record, and falling only 8 bushels short of the 1948 record. SWEET POTATO crop was 18 per cent below the average of the past 10 years. Yield was 99.9 bushels per acre -- 10 bushels more than the average.

RICE crop in 1949 set a new record at 87,491,000 bushels. Yield was 48.8 bushels per acre, higher than 1948 and above average. A tropical storm cut the Texas harvest by 2 million bushels.

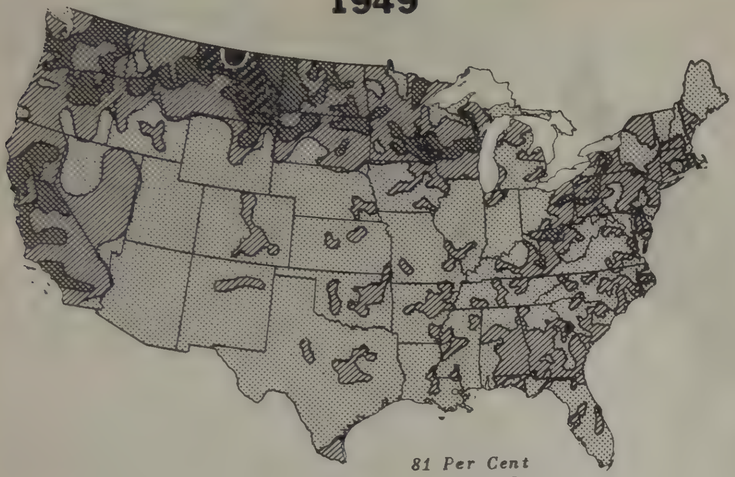
APPLE crop for 1949 totaled 133,388,000 bushels -- 1½ times the 1948 crop and one-fifth above the 10-year average. In comparison with last year, production was three-fourths greater in the North Atlantic States, and more than double in the Central States. PEAR crop is two-fifths above 1948 crop and totals 36 million bushels. GRAPE crop is 2.9 million tons -- 6 per cent below last year. Total California crop was 6 per cent smaller.

SUGAR CANE crop, at 7,920,000 tons is 17 per cent larger than 1948 crop and 30 per cent above the average of the last 10 years. SUGAR BEET crop is a little larger than last year.

PASTURE CONDITIONS

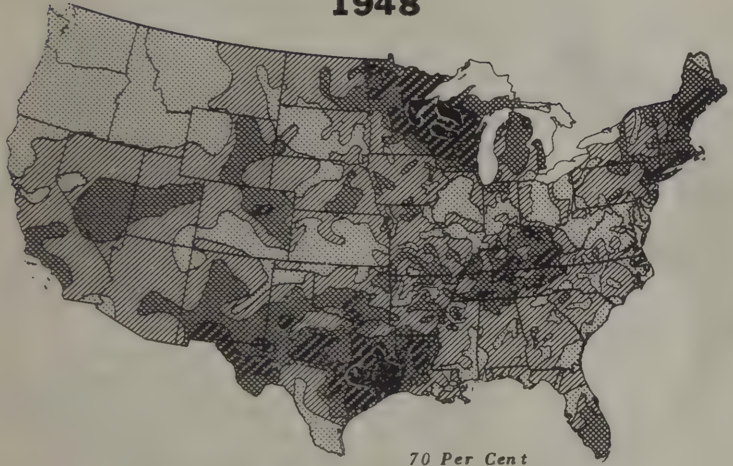
NOVEMBER 1

1949



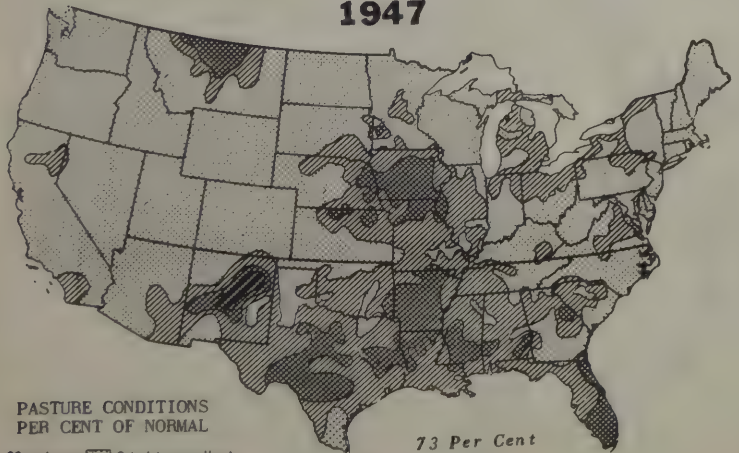
81 Per Cent of Normal

1948



70 Per Cent of Normal

1947



73 Per Cent of Normal

PASTURE CONDITIONS
PER CENT OF NORMAL

80 and over ░ Good to excellent
65 to 80 ▨ Poor to fair
50 to 65 ▩ Very poor
35 to 50 ▓ Severe drought
Under 35 █ Extreme drought

Based on USDA Data

Hay and roughage supplies are about average for the country as a whole. Supplies may be inadequate in parts of the Northeastern dairy area, but a late fall has boosted roughage supplies there. Fall and early winter grazing is very good in the central and southern Great Plains and the Southwest, but feed is short in most northern parts of the Plains and in the Pacific States. Wheat pastures are furnishing exceptionally good grazing in the Great Plains.

Farm pastures the first of the summer were among the best of recent years in nearly all parts of the country. Pasture and ranges in the central Great Plains were furnishing exceptionally good feed -- Kansas and Oklahoma pastures were the best since 1922.

By July, dry areas were beginning to show up but pastures were considered as being about normal for the country as a whole. Lack of rains had caused severe deterioration of pastures in the Atlantic seaboard states from Maryland north. Hay and silage were being fed by some dairymen in this area by the first of July. Pastures continued in excellent shape in the Great Plains.

During the summer, pastures continued to dry up in the northeastern states as that area went through its worst drouth in years. Condition of pastures was the worst since 1915. More and more dairymen resorted to hay and silage feeding during the summer and increased grain feeding.

The northern Great Plains area -- North Dakota, South Dakota and extending on over into Wyoming, Montana, and northern Idaho -- was also much drier than usual. Parts of Washington, Oregon, and California were also short of pasturage.

By the first of September pastures for the country as a whole were again better than usual. Rains fell in the northeastern states during the last of August and broke the drouth. Pastures continued to be exceptionally good in the South, part of the Mid-west, and in the eastern and southern Rocky Mountain states. Range and pasture grazing remained short in the Dakotas and Montana.

Through the early fall, pastures continued to improve in the northeastern states and farmers obtained later grazing than normal. Also late cuts of hay have been possible in that area. Grazing remained short for livestock in the Dakotas, Montana and northern Idaho and some supplemental feeding on ranges was necessary by October. Reductions in livestock took place. However, snow fell over this area during October. Pastures and ranges picked up and showed noticeable improvement.

Throughout the South the condition of pastures the first of November was better than either last year or average. Fall sown small grains have made good progress and are furnishing considerable feed.

FARM OUTLOOK FOR 1954

A storm of economic adjustment has been breaking all around farmers during the past 2 years. Prices received for farm commodities hit an all time high in February 1951. Farm costs advanced for another 15 months after that. Since May 1952, both prices paid and prices received by farmers have been coming down. The problem is that prices received have been dropping 4 times faster than prices paid.

The squeeze on farm incomes has become very serious. The parity ratio in October dropped to 91, the lowest point since May 1941. After paying operating costs in 1953, farmers will realize as net income only 36 percent of their gross income. This is the smallest percentage that they have realized since the depression year of 1932.

1954 Looks Better -- prosperity isn't just around the corner, but the worst of the adjustments are past. Prices received should stay close to present levels and any further decline should be about offset by lower costs. The parity ratio could show some improvement yet this winter. Prices are touching bottom.

The New Farm Program will look much like the old farm program. Remember, the present law does not expire until the end of 1954. For long range planning bear these facts in mind:

- The present farm program was written by a coalition of northern Republicans and southern Democrats. The new law will be written by a similar group of politicians.
- Mid-term elections next fall are very important to both political parties. Republican policy makers will want the farm vote.
- Farm Bureau and Grange will have a larger voice in framing new farm legislation than they had in the past. But Farmer's Union has been getting many headlines and has strong connections.

High Farm Price Supports have become a tool of power politics. This means that over the years farmers will get more, not less, government controls. For the present this seems to pay off in terms of high prices. But over the long pull, dangers are evident.

City consumers are gaining strength politically. Labor politicians now team up with farm groups in an effort to win support for their own special objectives. Yet, instead of striving to give consumers more milk at lower prices, they order strikes for higher pay and shorter hours. These raise consumer prices and cut milk consumption. The New York milk strike in October 1953, added a half cent per bottle to the housewife's price for a quart of milk. This is equal to 23 cents per hundred pounds of milk, and makes the spread between farmers and consumers just that much wider.

Inflation is still the dominant force in our national economy. Long range plans should be made with this fact in mind. However, the immediate short range farm outlook is for stability at about the present level.

By the fall of 1954, it should be possible to size up the situation with more clarity. But election returns this fall seem to bear out the basic concept stated here a year ago that "The American people, who make up both of our great political parties, will... choose inflation."

Within this concept you can make plans that should serve you well in the years ahead. For now, use caution in contracting heavy debts that come due within 3 to 5 years. Keep more than the usual amount of cash on deposit or in government bonds, but do not hesitate to use cash reserves if unusual opportunities come your way. Few farmers under 45 can afford to be more than 60 percent liquid under present conditions. For them, long-term inflation will pay part of the interest charges on a farm mortgage. Interest deductions on income taxes will pay another part.

Good managers can profitably use borrowed money in their farming operations. A good rule to remember is that total debts should not exceed net worth. For every dollar you have in the business, you can borrow another dollar to use in your farming operations.

A PLAN FOR 1954

The following plan is recommended for farmers under 40. Men over 40 should be more conservative. Those over 55 should not take major financial risks at this time.

→ Borrow money to expand your business and make full use of your farm management ability. Avoid debts for non-productive uses.

→ Refinance short-term debts into long-term debts if you cannot reduce them. Keep your credit rating strong.

→ Watch market developments closely. Planned programs can be changed with less risk in 1954 than in 1953. Major changes in price trends are more apt to be up than down.

→ Continue to invest in labor-saving buildings, machinery and equipment. Labor will be scarce and wage rates high.

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ADJUSTING TO THE COST-PRICE SQUEEZE

Selected quotations from the National Outlook Conference of special interest to farmers and the businessmen who serve them

"Farmers are not very happy these days ...but farmers are not as bad off economically as they think... Unless the world situation changes considerably...it is our guess that such conditions may be around for some time."

DAIRY, BEEF CATTLE AND HOGS

"Farmers will be carrying a few more dairy cows. All...regions in the United States are showing an increase... Pretty good feed supplies, low prices for cull cows, improved position of dairy relative to beef, and the squeeze on profits will encourage dairymen to carry a few more head to try and make ends meet.

"Beef cow numbers will not change much ... Farmers are a little too cautious about buying feeder cattle. I believe that farmers will make out better than they anticipate. The number of spring pigs farrowed will be up--maybe as much as 10 percent.

BUYING, DEBTS, AND INSURANCE

"There is probably a little less interest now relative to applying lime, buying good seed, improving the breeding stock, testing the cows, etc., but this we believe is an error on the part of farmers. In general, farmers seem to be more anxious to pay debts than to add to them.

"The insurance programs of...farmers are generally very inadequate. I dare say that 90 percent of...farms need more fire and wind insurance. Our young farmers with families need much more life insurance. Only a few of the farmers...recognize the importance of liability insurance. Most all of them need this."

John C. Doneth, Michigan State College.

BUYING FOR THE HOME

"The problem of family adjustment to change is not new. Any family with a new baby, or a freshman in college is fully aware of the necessity for adjustment..." In a brief survey to determine the effect of the cost-price squeeze on home situations it was found that (in Missouri) "from 15 to 30 percent of the people had planned to buy, but did not buy, home freezers; 13 to 18 percent television sets; 12 to 22 percent automobiles; and 12 to 35 percent furniture and/or rugs...1 to 8 percent had planned to buy irons, but did not.

EDUCATION AND MEDICAL

"A vital factor included was plans for the education of children. In three counties from 3 to 7 percent of the women said they had given up plans to have children finish high school and from 2 to 7 percent had given up plans for sending young people to college. Planned vacation trips were given up by from 30 to 60 percent of the families.

"Another vital item was medical attention. Reports showed that from 4 to 26 percent of the families had not had needed medical attention. Coupled with this factor is the report that from 20 to 60 percent of the families are trying to cut food costs. From 20 to 75 percent of the families are trying to cut down on one or more items of cost for family living."

Starley M. Hunter, University of Missouri

HIGH BREAK-EVEN

"All farmers will have to watch more closely for the break-even points in the use of all variable costs in all parts of their farm business. It now appears unlikely that they will need to retrench sharply in most improved techniques; such as use of fertilizer, balanced livestock rations, pest and disease control programs. But rising hired labor and equipment costs may make some rearrangement of the system of farming necessary so as to economize on these large items of cost."

C. W. Crickman BAE, USDA

WHEAT TROUBLES

"The adjustment problem of the individual wheat farmer has both its immediate and longer-run facets. A shift to cash crops would produce immediate income from the land. A shift to grains for feeding on the farm would mean a delay in income from the source up to a year or more. And a shift to hay and pasture in large part would result in postponement of several years while herds were being organized and grass was being established. The longer-run adjustments almost always are the most difficult to make, but if they are in the direction of balancing production with available markets they should be encouraged."

W.A. Bailey and C.W. Nauheim, BAE, USDA

COTTON ADJUSTMENTS

"Operators of farms on which cotton mechanization does not appear feasible, but on which labor-saving techniques can be used in the production of soybeans, oats, hay or seeds might be justified in purchasing equipment to increase the efficiency of these enterprises.

Farmers...whose longer term plans call for continued or increased emphasis on cotton, might grow soil improving crops on some of the land diverted from cotton... Many farmers will consider it advisable to produce cash crops such as soybeans, oats, grain sorghum, corn and hay. The crop chosen will depend largely on the type of land diverted and the equipment available."

E.L. Langsford and R.B. Glasgow, BAE, USDA

FARM OUTLOOK FOR 1951

War and inflation overshadow everything else in the 1951 farm outlook. Any doubt as to whether this is World War III or, more correctly, the third phase of a World conflict that began in 1914 is fading. Events of the last few months lead to only one conclusion -- we are now in a BIG war. A national emergency, with all the restrictions and controls this implies, may be declared any time.

WHERE TO FROM HERE?

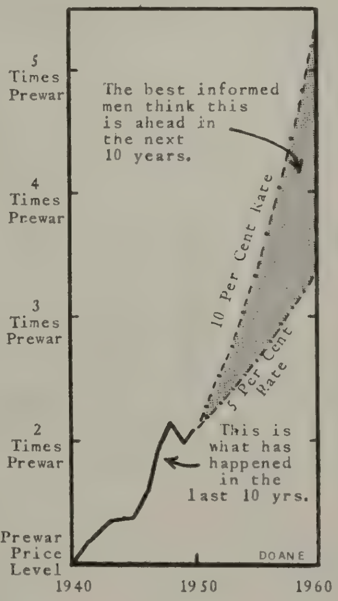
A year ago in this forecast we called attention to the danger of possible further inflation. Since then prices have gone up 13.2 per cent and wages have climbed even faster. Today we are face to face with the problem of how to deal with inflation.

GOVERNMENT CONTROLS will not prevent inflation. The most we can hope for is that Washington will so guide the forces of inflation to avoid serious upsets or "crisis inflation".

Prices now average just about double what they did in 1939. Some things are up a lot more, others not so much -- because everyone does not share equally in a price rise.

By 1955 prices may be close to 3 times the 1939 level -- this according to our studies and the views of some of the best informed men we know. Inflation is expected to continue at an average rate of at least 5 to 10 per cent per year for a long time. (See graph)

PRICE LEVELS TO EXPECT IF INFLATION CONTINUES FOR 10 YRS.
Index of Wholesale Prices
1939=Prewar



What History Shows -- You need to go back before Korea to understand what has happened since last year at this time.

Until June 24, 1950 the nation was not in a shooting war. But we were in the early stages of an inflation that looked a lot like that which France and Italy experienced after World War I. These governments had paper money like ours, that could not be redeemed in gold. Both ran up huge debts from 1921 to 1926. As a result, they had severe inflation even in peace time. It was not until prices had gone to 8 times their prewar level that France called a halt by balancing her budget and devaluing her money to 1/5 of its prewar value. Italy's history was similar.

The late Leonard P. Ayres of the Cleveland (Ohio) Trust Company, once summarized the situation like this --

"Continuous deficit financing by the national government steadily increases the volume of money. This money constitutes an effective demand for goods. The increasing demand for more goods results in larger outputs of them. As capacity outputs are approached ... prices advance, as do also the wages of the workers. This results in general price and wage increases, and a condition that we term inflation develops. However, up to this point the effect of the monetary expansion may not be serious.

"**Crisis Inflation** develops when ... the continuing increase in the amount of money, fails to produce a further increase in the production of goods. All that is necessary to produce this result eventually is a sufficiently long period of large scale deficit financing by the national government."

War spending simply adds more fuel to the fire of inflation.

WHAT TO DO IN 1951

All plans for the future must take inflation into account. The problems will be just as big -- just as destructive as those of the depression in the 1930's.

☞ **Take Reasonable Risks** -- Inflation soon erases mistakes in judgment.

☞ **Keep Your Money Working**, but hold enough in reserve to protect you as cash operating costs rise. Our money is worth only 56 cents on the dollar today compared to 1939. It may be worth only 25 or 30 cents by 1955.

☞ **Stick To A Few Major Lines** Family farms that have only one major class of livestock and only one principal crop generally pay off better than highly diversified farms.

☞ **Plan The Farm And Family Budget** High farming costs also mean high living costs. Talk the problem over with your family. Let them all help figure out the answers on money matters.

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FORECAST FOR 1951

Wages will go up another 5 to 10 per cent during 1951, unless a wage-freeze is clamped on by presidential order. A freeze would only reduce the rate of advance -- not stop it. Basic hourly wage rates under a wage-freeze will be permitted in hardship cases and will be allowed to reflect upgrading of workers. Overtime pay for all work over 40 hours per week will be on top of this. The 12½ to 28 cents per hour increase granted by the big steel producers has already become the goal of many other unions.

Unemployment will shrink to less than one million workers by late spring. The low birth rate of the depression years is now beginning to catch up with us. With fewer young men, we must build a 3 million man army and provide replacements for workers who retire or die each year. This situation points to a severe labor shortage and is one of the big reasons for the continued up-trend in wages.

Money in the hands of consumers will increase rapidly in relation to the amount of goods available next year. Production of consumer goods will drop sharply by mid-summer while income shoots up to a new all time high. In addition, the government will be feeding inflation by going into debt.

The Federal deficit may be at the rate of 10 to 20 million dollars a day (maybe more) by the end of next year. To this you can add $400 million to $1 billion representing the second G.I. insurance refund and $1,600 million for maturing war bonds. The only possible time during the year when people might be short of cash is for a month or two after the first of the year -- when income taxes and Christmas bills must be paid.

Wholesale Prices have advanced nearly 9 per cent since the War started in June. The index is now 171.2 per cent of the 1926 base period. Prices are going much higher. Increases will affect almost everything that you buy from the store. Clothing of all kinds is likely to go up faster than almost anything else.

Construction of new homes has dropped sharply since the new credit controls went into effect -- from an index of 530 in May to 354 in September. Industrial construction is expanding and should take up the slack. Reports indicate that the government is still going ahead with most of its Public Housing Projects.

Demand for most agricultural products will exceed 1950 production. It will take a bumper crop to even begin to satisfy demand. A short crop would spell disaster. Over 300 million bushels of corn will have to come out of government storage to fatten next year's hogs. It will take all of the soybeans produced in 1950 to fill oil and feed needs. The shortage of cotton is already acute. Only wheat, of our major farm crops, will remain plentiful.

Cash Farm Income for 1950, excluding government payments, is estimated at 27.6 billion dollars -- down 2 per cent from 1949. Cash receipts are expected to be up at least 10 per cent to about 30.5 billion dollars next year.

Net Farm Income is now estimated at 13.3 billion dollars for 1950. This is 6 per cent less than in 1949. Net income next year will shoot up an estimated 15 per cent to around 15.3 billion. This will be just about enough to offset the increase in prices of things you buy. Thus you will be handling a lot more money but only holding your own in terms of what you can buy with it.

Exports -- The gap between the value of imports and exports has been closed in recent months. We are now buying as much from others as they are buying from us. This creates a balance of trade that puts foreign countries in a much better position to buy and pay for the things they need from America.

Farm Machinery now costs about 2/3 more than it did in 1941. But, compared to the number of bushels of corn or 100 pounds of pork it takes, most machinery is a good buy. Prices are certain to go higher in the year ahead. Wage rates in machinery factories are double what they were in 1941 and material costs are up more than 80 per cent. Shortages of machinery may show up a lot quicker in some lines than expected. As a result of strikes, production of farm tractors in October was only 19,047 compared to 48,813 in August and 41,613 a year ago.

Fertilizer -- Critical shortages of superphosphates are in prospect because of the shortage of sulfuric acid. Nitrogen and potash supplies may be short at planting time because manufacturers do not have enough storage space to take care of all needs.

Prices are on the way up, but fertilizer will still be one of your best buys next year. The important thing is to place your order NOW, not wait until you are ready for it. Beat the price rise by buying while you can still get what you want.

Farm Land Prices are going up rapidly at the present time. They will keep on going up as long as inflation continues. Thus, if the long range appraisals shown on page 11 are right, you can look for land prices to keep climbing for a long time.

☞ Good land is generally considered to be one of the best hedges against severe inflation. An owner occupied, family size farm, in particular, looks like as good a hedge as you can find. Even at today's high prices, good productive land free of excessive debts is a very dependable investment -- if not burdened with a heavy tax load.

FORCAST FOR 1949

The farm outlook for 1949 is good. Prices will stay high by prewar standards, but farmers must keep their guards up. The two price breaks in 1948 are enough to convince all of us that farm commodity prices are no longer on a one-way street.

In planning for the year ahead, it is necessary to choose between two broad possibilities:

☞1 Maximum return with a high degree of risk.

☞2 Hedged and relatively lower net return with a high degree of certainty.

Following 1920, many farmers and businessmen lost everything because they chose to assume big risks. They felt that we were on "a new high price level". Today we hear this same voice of overconfidence.

Certainly things are different now than they were back in 1920 and it may not be necessary to repeat the experiences of 1921 and 1932. We hope not! Even so, the man who plays it safe can hardly be called a loser.

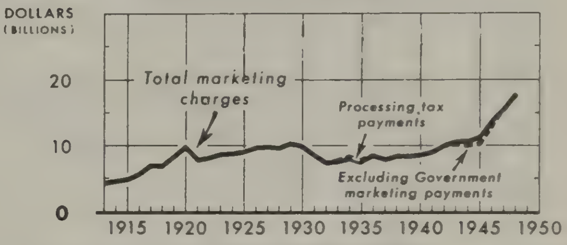
Within the second concept of good management there is much that can be done to maintain farm income and still have security. The next several years will be a period when a big volume of business will be essential. The usual way of increasing the size of the farm is to buy or rent additional land. However, big acreage is sometimes a disadvantage when prices are declining.

The proper use of fertilizer, cover crops and manure; the use of improved seed and better livestock are safer methods of upping the total volume of business in 1949. This is especially true if present acreage is approaching the limits of labor and machinery.

Emphasis on a few major lines will pay best. Kansas studies show that the farmers who maintain the highest average net income year after year produce only one major crop and handle only one major class of livestock.

Vertical farm diversification will become more important for those who have the facilities to do their own processing. Since 1945, the cost of getting farm products from the farm to the consumer has gone up $6,700,000,000. It has more than doubled since 1939. These costs stay up because wages, freight rates and fixed costs change slowly. It will be only a matter of time until farmers, individually or through their co-operatives, shift their operations to keep more of these dollars at home.

THE NATIONAL MARKETING BILL FOR FARM FOOD PRODUCTS



DATA FOR 1948 ARE PRELIMINARY ESTIMATES

U. S. DEPARTMENT OF AGRICULTURE   BUREAU OF AGRICULTURAL ECONOMICS

President Truman and the 81st Congress are expected to stand by their party platform but Southern Democrats hold enough power to block some plans of the administration. Already there is talk of continuing the farm price support program at 90 per cent of parity indefinitely, even over the objection of many farm leaders.

Labor spokesmen will have a larger voice in government. They expect quick repeal or modification of the Taft-Hartley act and higher minimum wage rates. Defense spending is to increase, the national budget will be upped, and export goals advanced.

These steps will have an inflationary effect on prices and costs. Prices received by farmers will be higher than would otherwise be possible, but costs will be even higher. Profit margins will be reduced for all but the most efficient farmers and farm buying power will continue to decline.

WHAT TO EXPECT IN 1949

Inflation — unless something happens to give our economy a new "shot-in-the-arm", we are now passing the peak of post-war inflation. The sharp decline in security prices since the election is one

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indication of trouble ahead. Commodity prices seldom, if ever, advance in the face of such a major break.

Albert Goss, Master of the National Grange, told 20,000 farmers assembled for the 82nd annual convention last month that "almost every factor" which led to the last post-war crash is present today.

The inflation peak has already passed for agriculture. It remains to be seen whether new defense spending will be enough to take up the slack in industry. The next six months may reveal some unexpected developments.

Wages — A fourth round wage increase seems certain. Lay offs are increasing but the overall labor situation remains tight. Farm wage rates are now 3 to 10 per cent higher than a year ago and will continue high.

Prices of many industrial products will continue to advance as labor costs are passed on to the consumers. The farmers share of the consumers food dollar will become steadily less.

Income — National income will be down next year but still high compared to 1939. Farmers will get a relatively smaller share than in recent years.

New Construction — There is a growing realization that home builders must shift to low cost construction if volume is to stay high. The new Congress will reconsider government subsidies for low-cost housing. Industrial construction has passed the peak but many companies have yet to complete their post-war building program.

War and Defense — The possibility of war with Russia over Berlin appears to be a fading prospect. The "cold war" is not over, however, and East-West differences will continue to flare up in Palestine, China and other trouble spots. We now have over 1 million men under arms, a peace time draft, and plans to mobilize the nation's industry over night if war should break out. Stand-by ration controls are to be pushed in the new congress -- "just in case".

Demand for many agricultural products is short of available supply at present prices. Feed grains, wheat, potatoes, dried fruits and many other products are being supported with government loans and purchases. Meat is in a relatively strong position. Livestock prices will hold above parity levels during 1949.

Cash Farm Income in 1948, including government payments, will total about 30 billion dollars, slightly below 1947. There will be a further decline in 1949.

Net Farm Income for 1948 is estimated at 16.5 billion dollars compared to 18 billion last year. Buying power in the hands of farmers after deducting production costs and allowing for the increased cost of living is down about 17 per cent from last year.

Both net farm income and farm buying power will decline in 1949. Livestock and dairy producers will be affected less than most other farmers.

Exports — Crops in Europe were good this year and they don't have to have our grain, but exports are to be high to help prevent big surpluses at home. Total wheat exports may be pushed up to 500 million bushels and corn exports are to be increased.

It becomes a question of how much longer consumers will stand for high food prices and high taxes to subsidize food exports that keep prices up. Most foreign countries are shifting their cash buying to machinery and industrial equipment so they can get their people back to work.

Farm Machinery — The supply situation is beginning to ease. Production of farm machinery in 1948 was at a record high and will have a high priority on the use of materials even if defense demands for metal become heavy.

Light tractors can now be had with little or no delay. Heavier tractors are still scarce especially in the more popular makes. New labor saving equipment such as one-man hay balers, cotton pickers and the like will not catch up for some time.

Fertilizer supplies are increasing and shortages will be less acute than in 1948. The big 1948 crop drew heavily on plant food reserves in the soil and unless these are replaced, crop yields are sure to be down in 1949.

Farm Land Prices have probably passed their peak and will now level off and later come down slowly. Mortgage indebtness is low compared to 1920 and most farm land is in strong hands.

A repetition of the 1921-32 break in land prices is not expected. Good land is still a dependable investment if not burdened with high taxes or an excessive mortgage. However, it is unsafe for most farmers to buy a farm at today's prices if the mortgage exceeds 30 to 40 per cent of the purchase price.

(Part Two continued on Page 13)

FARM OUTLOOK FOR 1950

The farm income outlook for 1950 is not as bright as in any of the last three years. We must face the probability that in the year ahead prices of farm products will decline another 10 per cent or more. ☞ Net farm income will drop at least 15 per cent.

High Costs rather than low prices are backing many farm operators into "the corner". The average price of all farm products is still 2 1/2 times higher than in 1939. BUT, dollars now buy much less.

The problem is that prices paid are down only 4 per cent from the peak while prices received are down 21 per cent or 5 times as much. Even this small decline in costs would not have been possible, if food and purchased feeds (coming from other farmers) did not make up part of the cost index.

DANGER AHEAD???

This problem of high costs suggests that there is another side to this whole question, of -- WHERE DO WE GO FROM HERE? We have faith that our economy will continue sound; however, there are dangers to examine.

☞ A new wave of inflation is possible if we continue to operate the government by deficit spending. And, there are those in Washington who say we cannot call a halt; that it is politically impossible to balance the budget.

There is nothing in our own recent history to help us understand what might happen if inflation takes hold again. However, France and Italy had such an experience following World War I. Here is what happened:

When war came in 1914, prices in France rose rapidly and went up to a peak in 1920 which was 5 times the level of 1914. Then came the post-war depression of 1921 much like we had in this country. However, a new boom got under way early in 1922. Industrial production doubled and prices kept right on going up at the same time. By 1926 it took 8 times as much money to buy things as in 1914.

Deficit Spending was the cause of this second and more destructive wave of inflation. It was not stopped until France devalued her money to 1/5 of its prewar value and balanced the budget. Italy's story is the same as in France but with minor differences. England escaped inflation by balancing her budget in 1920.

The late Leonard P. Ayers of the Cleveland (Ohio) Trust Company said in 1936 --

Crisis Inflation *develops when the continuing increase in the amount of money fails to produce a further increase in the production of goods. All that is necessary to produce this result eventually is a sufficiently long period of large scale deficit financing by the national government.*

☞ We could be closer to such a period in our history than any of us dare think today.

① We now have a 40-hour work week and some labor leaders are calling for still shorter hours with the same take home pay.

② We now have a 75-cent minimum hourly wage rate with nobody working harder.

③ We now have high farm price guarantees and crop controls to limit production.

④ We are now in our 18th year of deficit spending -- out of the last 20.

WE DO NOT EXPECT the United States to go the route of "Crisis Inflation" -- but with so much smoke there may be some fire.

WHAT TO DO IN 1950

We are not predicting a second wave of inflation at this time. If it should come, it would only multiply the problems of farming. For, without the big demands of war to use up agricultural products, farmers would be at a big disadvantage if the prices of the things they buy kept going up and up.

☞ **Play Safe.** History may show that the graph on page 19 is wrong but it would be a lot better than what France had. Certainly this is not a time to take major risks.

☞ **Plan For Big Production.** Big volume does not always mean lower costs but small volume almost always means high costs. The safest way to get big volume is by using fertilizer, limestone, good seed and insecticides.

☞ **Stick To A Few Major Lines.** Kansas studies show that family farms which have only one major class of livestock and only one principal crop pay off better than similar farms with may sources of income.

☞ **Plan The Family Budget.** Talk over the problems of high operating costs with the whole family. Let them see why it would be poor judgment to cut certain operating costs in order to buy some of the things every family wants. It is no sin to borrow money for sound productive purposes -- but over-spending for WANTS is bad. It is time to call a halt. Short term debts are growing larger.

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FORECAST FOR 1950

Wages will continue to work higher during the coming year. Beginning late in January many of the lowest paid workers will find their pay automatically increased to 75 cents per hour. This will force other adjustments throughout many organizations to keep wage and salary scales in line. The pension plans granted in Steel will also spread to other industries.

Unemployment may grow even while wage rates are advancing. There is considerable doubt that everyone now employed at less than 75 cents per hour will find work at the new wage rate. Industry appears to be about caught up in many lines. It will take fewer workers to produce the houses, automobiles and other things that we will buy next year.

Money in the hands of consumers will continue large. The total money supply will be increased by deficit financing on the part of Federal Government. This will not be enough to maintain total purchasing power at the level of 1949 but it will be an important factor in preventing a further rapid decline.

Prices of industrial products in general will not change much in 1950. Few price cuts are possible except as new methods of production are worked out. Labor costs figure big all the way from raw material to finished product and it is only as labor is taken out that prices can be lowered.

New Construction -- Industrial construction is declining rapidly now but home building and public construction are high and help hold up total volume. The need for new roads and new schools will continue to grow for many years. Public housing under the new law is expected to be a major prop under new construction during the next year.

War And Defense-- The possibility of war in the next few years grows less and less. The new A-Bomb scare, however, may help keep expenditures for the armed forces at a high level. Gradually we are working closer to an armed but uneasy peace.

Demand for most agricultural products is filled at present price levels. Huge surpluses of food, feed grains and fiber have been accumulated at government expense during the past year. Some of these surpluses are desirable as a hedge against drouth or crop failures. For others we see no possible economic use unless our entire farm economy were knocked out by total war.

Cash Farm Income in 1949 excluding government payments will total 27.7 billion dollars, down 9 per cent from 1948. A further decline of at least 10 per cent is forecast for next year. "The total volume of farm marketings is likely to be less next year than in 1949. Although the large 1949 crops will help to maintain the level of crop marketings in the first half of the year, the production control programs now in prospect probably will result in lower crop sales during the latter part of 1950 than in the same period this year." (USDA)

Net Farm Income for 1949 is now estimated at 14 billion dollars, down 16 per cent from 1948. Net income in 1950 may slide to 12 billion or less. This would be down one-third from the 1947 peak. ☞ In terms of buying power, it represents a decline of about 34 per cent from peak reached in 1946.

Exports -- The exporting of American farm products is getting harder all the time. The volume is now largely dependent on our give-away programs. Devaluation in most of the countries outside the U.S. gives Canada, Argentina, Australia and other "cheap money" countries, an advantage in world markets.

Imports of competing agricultural products will increase. We appear to be moving in the direction of "free-trade" at a time when world trade is anything but free.

Farm Machinery -- Supplies are sufficient to meet the most urgent demands now. At present prices, the industry will probably catch up completely in 1950. Prices of new machinery, however, may not come down much because pay raises in steel and in related lines must be converted into finished price.

Fertilizer -- The supply of nitrogen fertilizer will increase rapidly next year. About 20 to 25 per cent more nitrogen will be available. Prices should be down a little.

The capacity to produce other fertilizer will change more slowly. The Production and Marketing Administration estimates there will be 15 per cent more phosphorous fertilizer next year and 10 per cent more potash. Thus supplies will be pretty adequate. Prices should hold steady or decline some.

Farm Land Prices will decline further in 1950. One-crop areas which have been hit hard by crop allotments or bad weather will suffer most. The volume of sales has dropped sharply and prices are down as much as 12 per cent in some states. The national average in July was 3 per cent down for the Nov. 1948 peak.

There is still confidence that prices will not break as they did in 1920-32. Mortgage debt is not high and there has been relatively little speculation. With lower income ahead, it is not safe to invest heavily in farm land at this time unless the mortgage can be held to less than 40 per cent of the purchase price. Productive land which is free of debt is still a dependable investment if not burdened with an excessive tax load.

1954 LIVESTOCK FORECAST

FEED: Supply of concentrates per animal unit is 1.03 tons, highest since 1950. Distribution is poor. South is again short on grain. Corn Belt has plenty.

CATTLE: Very high slaughter has stopped the build-up in numbers. Prices have made their adjustment. Feeders should make average profits this season.

HOGS: Numbers are down and prices will be good first half of 1954. Next spring's crop will be up 5-8 percent, bringing lower prices late in the year.

SHEEP and LAMBS: Heavy slaughter will bring some further cut in numbers. Lamb feeding profits will be higher this season. Total slaughter will be down in 1954.

WOOL: Prices will average about same as 1953. Watch for price support announcement.

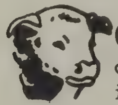
DAIRY: Cow numbers increasing. Carry-over of dairy products twice the average. Support level due to drop a little. Prices will be lower. Costs may ease off.

BROILERS: Further increase in production coming. Prices fairly stable at near 1953 level. Production costs are down 1-2 cents per pound.

EGGS: Little larger laying flock and a higher rate of lay in 1954. Prices will run below 1953, but still allow profits with the lower feed costs.

TURKEYS: Some increase in production seems sure.

Feed Supplies -- Enough feed concentrates are available to take care of all needs and leave a big carry-over. Supply per animal unit is near a record high. Protein supplements will be plentiful in all areas. Feed prices will be somewhat lower than last year, at least early in the season. Much surplus hay of the North Central states will be shipped to drouth areas.



Cattle -- Drouth and loss of confidence in the cattle market has resulted in a 1953 slaughter 30 percent above last year. The increase in cattle numbers has about been stopped. Cattle numbers on January 1 will total 93 to 94 million head. General cattle prices are at their low point now.

The nation's beef cow herd is not being cut much and dairy cow numbers have increased slightly. The 1954 calf crop will still be near-record. Average prices for all cattle in 1954 may be slightly above this year. There will again be normal profits in cattle feeding.

General rains in southwestern range areas should bring demand for stocker cattle by early spring. Weather and business conditions will set the demand for replacement cattle.

Hogs -- Marketings during the first part of the year will be slightly below last season. Prices will hold up well. However, the spring pig crop is expected to be up 5-8 percent, and next fall will see heavier marketings and somewhat lower prices. Corn is selling cheaper this year and hogs are higher, making a very favorable feeding ratio. Profits on hogs have been fairly high since last spring. Farmers are beginning to expand hog production.

Sheep and Lambs -- Slaughter is heaviest since 1948. Total numbers are being reduced slightly this year, in spite of a 7 percent larger lamb crop. Many lambs were killed that normally would have gone into feedlots. Feeding profits will be higher this season. Lamb prices in 1954 should be as high as this past year. Range operators are having trouble in getting cheap land and labor necessary to make money at present prices.

Wool -- Although the 1954 clip will be down slightly, no price rise is expected. The government still holds about 100 million pounds of 1952 wool and 41 million pounds of the 1953 clip were put under the loan. Wool interests are pushing for further tariff protection but such action is not expected soon.

Dairy -- Cow numbers have been on the increase because of reduced culling. Production per cow has dropped slightly. Some further expansion of dairy herds is expected, because of drop in beef prices and acreage cuts on cash crops.

Consumer demand for milk will be about the same as in 1953. With about twice the normal carry-over of dairy products and some increase in production, 1954 prices will be a little lower. Even if support levels are kept at 90 percent of parity, there will be some reduction because of the parity adjustment.

Broilers -- Consumers have accepted more broilers each year. Another increase of 5-8 percent is expected in 1954 and prices should still hold near the average for 1953. There is a tendency for less variation in price within the year, making broilers less risky.

Eggs -- The nation's laying flock will be at least 3 percent larger on January 1 than a year earlier. With continued increase in rate of lay, 1954 egg production will be more than the record output of this year. Prices will average lower than in 1953.

Farmers are expected to increase their flock placements this year because of the long period of high egg prices and the drop in profits from other farm enterprises.

Turkeys -- Profits in 1953 will probably be higher than last year, encouraging more production in 1954. Early preparations by hatcherymen indicate a larger hatch of poults than last spring. Not much price change next year. A sizable carry-over of storage stocks seems likely.

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X

1954 CROP FORECAST

Corn -- Total supply of nearly 4 billion bushels is within one percent of the record. About 800 million bushels were carried over. Amount of "free" corn will dwindle later in the season as farmers put more surplus 1953 corn under loan.

Total amount of corn used this next season may be greater than last because less oats and barley are available. 1954 corn acreage will probably be limited by allotments. The support level will be at 90 percent of parity.

Oats -- The total supply is 120 million bushels less than a year ago. But, unless Canadian imports are shut off, there will be plenty of feed oats. Acreage for 1954 will increase sharply because of acreage cuts in other grains and the 75 cent support price for oats.

Barley -- The supply is the smallest since 1938. Canada can furnish enough to prevent any shortage in the Midwest. Cuts in wheat acreage will result in a big increase in barley next year. The 1954 average support price will be a minimum of $1.15 per bushel.

Grain Sorghum -- The supply is 31 million bushels greater than a year ago but still below average. Exports will be expanded and more will be fed. Much acreage taken out of wheat in the Plains will be used for sorghum. The support will be $2.28 per cwt., national average.

Wheat -- A carry-over of 562 million bushels, plus the new crop, makes a record supply of 1.7 billion bushels. With domestic use of 700 million bushels, and exports of 250 million, a record carry-over of 775 million would remain.

Price of soft red winter wheat is well below loan level and is not expected to improve much. Other varieties are in a stronger price position. 1954 crop will be supported at a minimum of $2.20 national average. Marketing quotas are in effect on the 1954 crop and acreage was cut to 62 million acres. With an average yield next year, farmers will again be faced with voting on marketing quotas for wheat.

Rye -- Poor demand has allowed prices to slip to lowest point since 1945. Supplies are somewhat larger than last year and imports are running high. Acreage will increase some next year, due to cutback in wheat. Support price for 1954 rye will be $1.43, national average.

Soybeans -- The 1953 crop was down at least 32 million bushels from last year but there was a carry-over of 11 million bushels. Exports may be greater next year and more beans are under the loan program. All point to some price improvement.

Soybean acreage will soar next year if corn allotments come and soybean price support is kept at 90 percent of parity. Cotton quotas will mean more soybeans in the South.

Cotton -- A huge supply of 21 million bales is on hand for the year ahead. The carry-over at the end of this season is estimated at 8.4 million bales. Marketing quotas are expected to be approved in the December 15 vote. Under present law the 1954 acreage would be cut to 17.9 million acres. Support price would be 90 percent of parity. Congress is likely to increase the total 1954 acreage to over 20 million acres.

Flax -- The supplies of flaxseed and linseed oil continue to exceed the need. The 1953 crop was up 8 million bushels from 1952, meaning that the carry-over will be increased at the end of this season. Support price has been dropped to a national average of $3.14 per bushel.

Peanuts -- The 1953 crop is about 100 million pounds greater than the expected needs for next season. Most of this excess will move into CCC hands. Growers will vote on marketing quotas December 15 and are expected to pass them again. If so, support price on the 1954 crop will be 90 percent of parity and acreage allotment will be about the same as in 1953.

Tobacco -- Home demand continues strong and exports are expected to be as good as in the past year. Marketing quotas and 90 percent supports will be in effect next year on most of the crop. Maryland and Pennsylvania growers voted against a quota on their 1954 crop.

Potatoes -- Extremely low prices are discouraging growers from planting a large 1954 acreage. Growers of early spuds intend to cut acreage about 25 percent. Western late potato growers will cut acreage somewhat less. No support price will be available on potatoes.

Sweet Potatoes -- Production went up in 1953 and prices went down. Some land taken out of cotton will be put in sweets next year, bringing still weaker prices in areas that are not set up to market a quality product.

Truck Crops -- Demand will be as good as last year. Per capita consumption of frozen vegetables may increase, but stocks are at a record high level.

Dry Edible Beans -- Home demand will stay strong, but exports may drop off a little. Stocks have been further reduced during the past year.

Dry Peas -- The 1953 crop is up 28 percent from last year. Returns are expected to be lower and may result in less acreage next year.

Fruit -- With average weather, production of deciduous fruits will be a little higher in 1954. Citrus production will increase some, mainly in Florida and Texas. Frozen concentrate use is expanding.

Seed -- Supply of legume seeds is adequate. Some grasses are in shorter supply. Carry-over of most seeds should be cut down this next season, due to increased seedings.

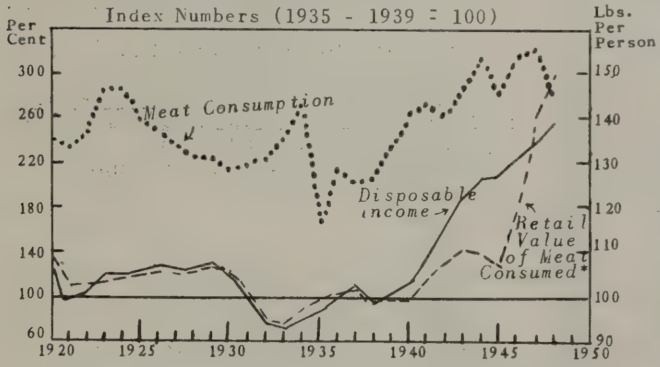
1949 LIVESTOCK FORECAST

(Continued from page 12)

The outlook for livestock and livestock products is relatively more favorable than that for crops. Feed ratios will be very favorable at least until mid-year when the size of the 1949 feed crops can be determined.

Total meat supplies next year will be enough to give consumers about 142 pounds per person. This is slightly less than in 1948 and seven pounds per person below the 1947 peak. Lower prices, however, are possible. In 1939 when hogs averaged $5.66 in December and cattle averaged $9.78 in August at Chicago, the meat supply per person was only 132.8 pounds. The high prices of livestock in recent years are the result of high consumer income.

MEAT CONSUMED PER PERSON - RETAIL VALUE OF MEAT CONSUMED AND DISPOSABLE INCOME PER PERSON, (INDEX) UNITED STATES, 1920 - 1948



*Calculated from total consumption (civilian and military) and average retail prices.

U.S.D.A., B.A.E.

Hogs — Prices will flatten out during the next few months, but at $20.00 to $25.00 a hundred, there is still good money in feeding $1.00 to $1.40 corn. Make hogs heavy. (See table in Dec. 501)

All reports from the field indicate that the 17 per cent increase requested by the government is not coming. This is one of the really big farm opportunities for 1949. Gilts bred in December will bring pigs in April. These pigs can be pushed with cheap 1948 corn and reach market in October ahead of possible heavy sales later in the winter.

Cattle — Prices will average lower than in 1948 but compared to hogs will hold relatively high. The usual seasonal pattern of price trends may be upset by lack of confidence in the future. Heavy receipts of short-fed quality cattle will be on the market during the next 60 days. Relatively fewer cattle are headed for the spring markets than usual. But, the number of quality calves and light stock to be sold in July, August and September appear very high.

By the end of next year, the number of all cattle will be down close to 75 million head or 10 million less than on January 1, 1945.

Sheep and Lambs — Profits during the next few months should be better than in 1948. Liquidation of ewe bands and farm flocks appear to be tapering off. However, no strong uptrend in sheep numbers is expected as long as cattle prices are good and rainfall in the range area is above the longtime average.

Wool and Mohair — Wool growers get the benefit of government price supports and a relatively strong domestic demand. But mohair supplies are accumulating and synthetics have taken over the market.

Dairy — Prices are now below a year ago and are not expected to show much recovery. Profits are up because feed grains and concentrates are cheaper. The milk-feed ratio will continue favorable at least until next fall.

Farm management studies show that it is the in-between operator who is being squeezed. Two or three cows for the home or a commercial herd of at least 15 or 20 cows are recommended - 30 cows are better for efficiency.

Poultry — More chickens and turkeys will be grown in 1949 than in 1948. Reports indicate that incubators will be booked to capacity and that one of the bottlenecks is a limited supply of good quality hatching eggs.

Profit margins on broilers and fryers will be very small for the average farmer by late spring. Pullets for the laying flock should be started in January or early February. Turkey numbers are sure to be increased next year. Prices will be down by next fall but profits will still be good because feed costs are lower.

Eggs — The price of eggs this winter will not get much above support levels. But, mid-west farmers are in a stronger position than a year ago because of the abundance of cheap corn. Culling should be held to a minimum.

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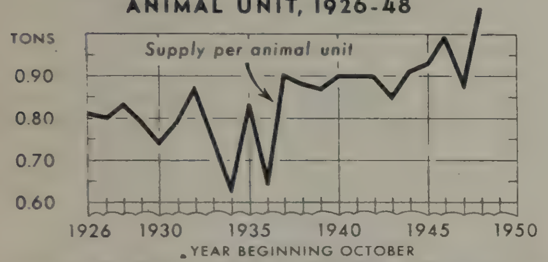
1949 CROP FORECAST

The record 1948 corn harvest dominates the entire outlook for feed and food grain. The grain market is very weak and, except for government price supports and subsidized exports, prices would be much lower. The feed supply is 1.06 tons per animal unit. This is a new all-time high.

FEED CONCENTRATE SUPPLY, ANIMAL UNIT, 1926-48



DATA FOR 1947 ARE PRELIMINARY, FOR 1948, AUGUST 1 INDICATIONS

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

Corn — Prices will get back up to support levels soon and should stay there except as periodic selling waves hit the market. Prices in feed deficit areas will soon begin to reflect ship-in costs. If prices are below supports and you have storage, take out a government loan and watch your chance to unload your cribs before the 1949 crop is harvested. Production next year may top 3 billion bushels, and this plus the 1948 carryover will cause a real storage problem next fall.

It will be good business to plant a large acreage. Acreage and marketing quotas may be used eventually and a historic base is the most likely method of figuring these.

Wheat — Production will be at record levels next year if weather continues favorable. Reports indicate a total seeding of about 79 million acres. Exports may be close to 500 million bushels; carryover about 280 million.

December 31 is the deadline for taking out government loans. Technically there are no price supports for opportunities to clear bins and granaries ahead of next year's crop. The longtime outlook for wheat is clouded by the fact that at support levels wheat is too high in price to feed.

Oats — Supplies are large and prices will not show much strength unless something happens to carry corn prices up.

Rye and Barley — The big profits are gone. Prices will follow wheat and corn.

Grain Sorghums — Prices will show little strength. Even at present price relationships, the amount that will go into mixed-feed outlets is small.

Soybeans — The longtime outlook is favorable but prices will average lower in 1949 than in 1948 if weather is favorable. The demand from Europe is strong.

Flaxseed — The 1949 goal will be at least one-third below this year. Supports will be cut back to 90 per cent of parity. If parity remains unchanged, the 1949 loan rate will be approximately $4 per bushel compared with $6 this year.

Cotton — Acreage controls are expected by 1950, so plant a full acreage and fertilize heavily in 1949. Acreage allotments and marketing quotas loom ahead. A large acreage and production record will help secure a favorable base.

Washington sources say that cotton may be supported at 92½ per cent of parity. This would further open the door to rayon and other synthetics which have already moved up from 5.9 per cent of the total market in 1933 when the first cotton loans were made, to 13.5 per cent this year.

Tobacco — The acreage quotas of flue-cured types will be about 5 per cent more than in 1948. Domestic use of Burley types will continue high, but may decline if the national income drops.

Potatoes — Price supports for white potatoes are to be at 60 per cent of parity, but production is expected to be sufficient for domestic needs.

Truck Crops — Acreage goals announced by the government are about the same as last year. Demand is closely tied to economic trends. Prices will be lower than in 1948 if the post-war boom fails to carry on through 1949.

Fruits — Prices of all fruits will continue low compared to other crops and compared to production costs.

Grass and Legume Seed — Many grass and legume seeds will be in short supply. The shortage is so general that second and third substitutes may be unavailable for those who wait until spring to buy.

The U.S.D.A. will support 1949 crop of winter cover crop seeds in an effort to boost 1949 acreage.

1950 LIVESTOCK FORECAST

MORE PORK, A LITTLE MORE MILK, LESS LAMB, SAME ON BEEF AND VEAL -- this looks like the livestock picture for 1950. Feed supplies per animal are the largest ever and are slightly above a year ago.

On the price side, the increase in meat production will result in lower prices for meat animals. Price reductions will be moderate so long as demand remains strong -- will be greatest for hogs and cattle.

Consumption of all meat next year will be close to 150 pounds compared with 147 pounds in 1949, the record of 155 pounds in 1947, and the average of 134 pounds in 1937-41. Most of next year's increase will be from hogs.

HOGS -- Lower prices but profitable; stay with them.
CATTLE -- Lower price trend; heavy receipts of good and choice cattle may weaken market.
LAMBS -- Price continues relatively high.
WOOL -- Lower prices; may sell at support level.
DAIRY -- Little lower prices; fluid milk market stronger than manufactured milk market.
CHICKENS -- Big production again. Lower prices.
EGGS -- Lower prices; more eggs.

Hogs — Prices should be favorable during first nine months, but much lower than same months of 1949. Market price during early 1950 may flatten out, longer than usual, at time support price scale moves up. Supports are not guaranteed after March 31 -- but will probably be set up somewhat lower than last year's level.

Spring pigs should again be pushed to catch the late summer market. Spring pig crop will be about 5 per cent larger than in 1949; this Fall's crop up about 13 per cent. This means 8 to 10 per cent more hogs in 1950. Certainty of corn support price but uncertainty of hog supports will discourage hog production to some extent -- but, stay with hogs -- they will continue profitable.

Cattle — Year average prices will be well below those of 1949. Don't be fooled by $40 tops for choice steers. They do not represent most sales. It is not practical for farmers to produce OR consumers to buy such high finish beef.

Present high prices for fed cattle plus the big corn crop have stimulated cattle feeding. More good and choice cattle than usual will be marketed off grain this winter and spring. Expect common steer prices to again be relatively better than prices of good to choice cattle in early 1950.

Heavy receipts of warmed-up, short fed cattle may be on the market during the next 2 months and weaken the market.

Sheep and Lambs — Lamb prices will remain high in comparison with other meat animals but will be below 1949 prices. Slaughter numbers may be even smaller than this year. Flocks are being rebuilt and thus lambs will be held off the market for breeding purposes. Number of sheep on farms on January 1, 1950 will be nearly as many as beginning of 1949, indicating the turning point has come in the sheep decline. Sheep will be profitable in 1950.

Wool and Mohair — Wool prices in 1950 will be lower than this year, even though the average support price will be raised from 42.3 cents per pound to approximately 45 cents. Reason is a decline in demand plus more foreign wool imports. Most domestic wools will drop to or near the support price.

Mohair prices will be supported in 1950 -- probable support of near 60 cents per pound.

Dairy — Prices to be slightly lower for milk and dairy products. Fluid milk and butterfat will remain in a much more favorable price position than manufactured milk products. Government support prices may average out around the same as this year, but surplus problems are piling up.

Number of milk cows is now the lowest on record in relation to the population.

Chickens and Broilers -- Prices likely to average somewhat lower in 1950 than in 1949. Demand will weaken. Chicken supplies per capita will be only a little lower than this past year. Drop in chicken production will be less than would normally be expected on the basis of 1949 prices. Reason is record large feed supply and attempt by producers to maintain farm income by greater use of family labor with poultry.

Eggs — Prices will be lower. Eggs will be more plentiful -- likely to have 5 per cent more layers on January 1 than a year ago, and there will be lots of feed. The government will buy eggs again. Support price will probably be 30 cents per dozen at the farm in the mid-west.

Turkeys — Lower prices. Production in 1950 will be about as large as this year, despite this Fall's lower turkey prices. Prices a year from now probably lower than now.

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1950 CROP FORECAST

Crop prices are now 26 per cent below the peak of January 1948. They will drop further in 1950, but the government support program will help stabilize them.

Feed concentrate supply is larger than in any past year. Corn supply is huge -- totaling four and one-quarter billion bushels. Large volume of feed grains under loan and continuation of price supports -- plus increasing livestock, will keep feed prices next year near the 1949 level. Protein feeds will continue to be high-priced compared with grains.

Corn — Prices will work up probably 10 to 20 per cent before they level off during the spring and summer. The "distress" corn without storage is being taken off the market rapidly.

Acreage allotments are now considered almost certain for 1950. It is probable that acreage in the Corn Belt will be cut by 20 per cent. This size cut would mean the smallest corn acreage since 1892. Support price for 1950 crop will be about $1.35 per bushel, national average. The market price will go under $1.00 per bushel if the growing season is good.

Corn supply is now very large. A carryover of over one billion bushels is in prospect by the time the 1950 crop is made.

Wheat — Even with a possible 10 million acre reduction in seedings for the 1950 crop, another billion bushel crop is probable next year if weather conditions are normal. Allotments apparently will be overplanted.

Price will fluctuate near the support level until the size of the 1950 crop becomes evident. Support price in 1950 will be 5 to 8 cents per bushel under the $1.96 of this year. Wheat produced outside the government program will probably sell at $1.50 per bushel or lower if crop goes over a billion bushels.

Oats — Prices will not show much strength. Crop will be larger if corn allotments are ordered since some of the acres will go into oats. Support price likely to be about 67 cents per bushel. Good seed will be scarce.

Rye — Feeding will continue comparatively small, due to the large supplies of other feeds. Support price may be near $1.24 per bushel.

Barley — Demand good for malting varieties. Support price near $1.06 per bushel probable.

Grain Sorghums — Support price will be the top price -- may be $2.04 per hundredweight. Acreage will be increased because of wheat and cotton allotments.

Rice — Acreage may be cut by 30 per cent, according to Washington reports. Support price higher next year -- close to $2.00 per bushel.

Flaxseed — Price support will be about $2.85 a bushel, Minneapolis basis -- a cut from $3.99 this year. Two years' supply is now on hand.

Soybeans — Price in spring and summer of 1950 may rise above support prices, due to big demand for protein feed. Support price for 1950 crop could go as high as $2.00 per bushel. Production will be greatly increased, -- unless acreage allotments are put on. Soybeans are the best use for much of the land that will have to be taken out of corn and cotton.

Cotton — Quotas and acreage allotments will cut production by one-fourth. Support price will be about 28 cents for 15/16 inch middling.

Total consumption by time next crop is ginned will be 12.5 million bales, including both U.S. mills and exports. Total supply available is 21 million bales -- 8.5 million bales more than is needed. Price through next year can be expected to fluctuate about the support price.

Tobacco — Demand will remain fairly strong. Leaf prices for cigarette types will be about as high as this year. Fire-cured and dark air-cured prices in late 1949 and early 1950 are likely to be close to the support level. Burley production will be cut 15 per cent.

Support prices have been raised by new farm law. Flue-cured boosted to about 43.8 cents per pound, burley near 43.9 cents.

Potatoes — Prices will average somewhat over the probable government price of 96 cents per bushel. Commercial growers have been asked to cut acreage by 7 per cent. Unless acreage is held down, production will far outrun demand at market prices.

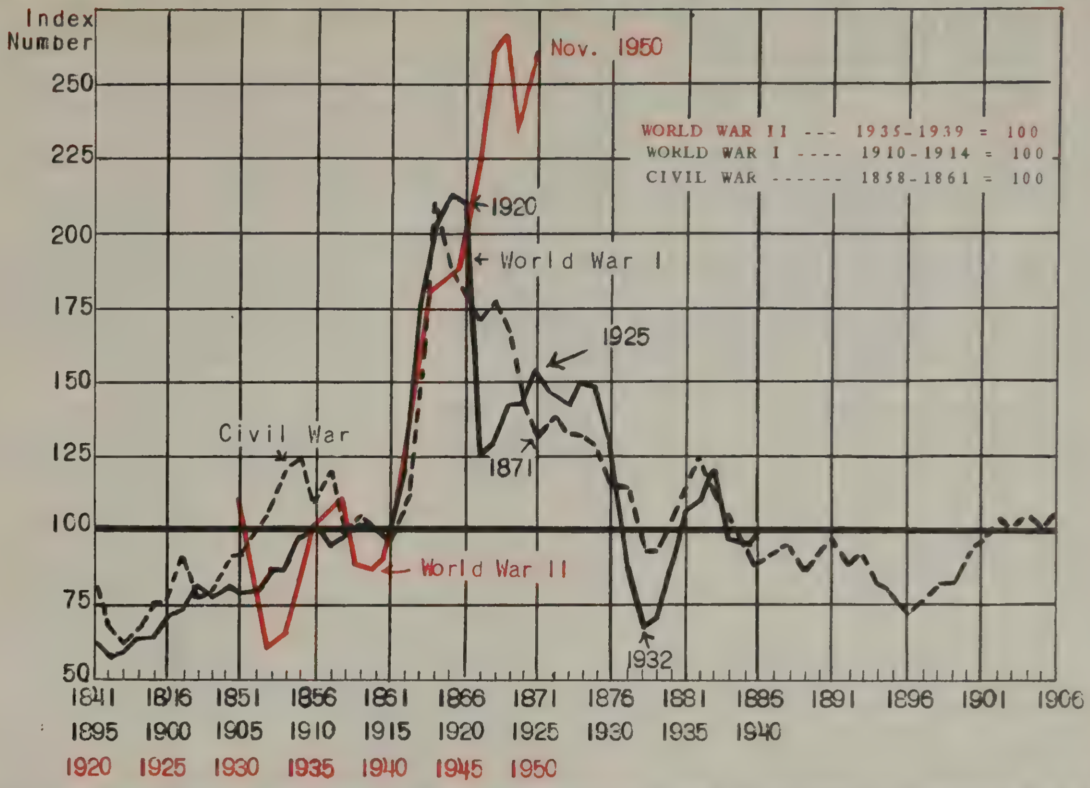
Sweet Potatoes — Supplies in spring months of 1950 will be larger than in 1949 and price lower. Prices received by growers for the 1950 crop will be lower than 1949 crop prices, since production will be up, weather permitting.

Dry Edible Beans — Large carry-over. Prices in first half of 1950 will continue to rest flat on the support price. Unless production in 1950 is cut sharply, supply will continue to hold price way down.

Dry Field Peas — Supplies at beginning of 1950 will be much smaller than a year ago. However, this big reduction is offset by much lower export demand.

Truck Crops — Prices in 1950 will be lower than in 1949 if production stays the same as it is expected to do. Cabbage, onion, and carrot prices until early spring are expected to be higher if weather is normal. Cannery demand should be stronger. Orange prices through next spring should be above 1949 levels. Grapefruit prices will remain higher.

PRICES OF FARM PRODUCTS AND WARS



INDEX NUMBERS OF PRICES RECEIVED BY FARMERS FOR FARM PRODUCTS IN THREE PERIODS, 1841-1906, 1895-1940 1930-1951

Extreme Price Inflation occurred during and immediately following each major war. During the Civil War and World War I these inflationary periods were short followed by long periods of price decline. The deflation cycle lasted for about 30 years after 1865.

After World War I, prices dropped sharply in 1920, then leveled off for 9 years before plunging downward into extreme depression. Prices had recovered to near pre-World War I levels by the fall of 1939 when World War II started prices up again.

Ceiling Prices in effect from 1943-46 halted this upward movement. But available statistics do not reflect the extent of wartime "black market" prices and subsidies. When controls were taken off at the end of the war, prices shot up to record highs. This was actually an adjustment between the huge demand for goods and the limited supply.

The Down Phase of the price cycle began in early 1948. But prices didn't continue falling as they did after the other major wars. Government policies have been different than after World War I -- have caused prices to stay high.

The National Debt is not being reduced as it was after World War I. This leaves more money in circulation for people to spend. In 1919 the federal debt was $25.6 billion. In 1924 it was reduced to $20.3 billion -- down 20.7 per cent; by 1930, $16.5 billion -- down 36 per cent. The gross federal debt reached $278 billion in 1945 -- dropped 9 per cent to $253 billion in 1948. Was back up to 257 billion in June 1950.

Government bond prices are now supported. Bonds can be cashed anytime. Banks holding large amount of bonds are almost unbreakable. After World War I, government bond prices were not supported.

Farm Price Supports after World War II have taken farm products off of the market and held prices to higher levels than if no loans or government purchases had been made. After World War I, government price support programs were not tried until 1929.

High Employment in industry and construction work has kept up a strong demand for food. Even though unemployment increased after the end of World War II, the number employed remained at or near record levels.

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WHAT TO DO ABOUT INFLATION

Military Spending continued at a high rate after 1945. Rapid disarmament after World War I reduced military costs to much lower levels.

The War In Korea came along when employment and industrial activity were already at high levels. Increased production of defense goods will cut down production of civilian goods. Fewer goods to be bought with the same amount of money will force prices higher.

Further Price Inflation is sure to take place. Credit curbs, higher taxes, and government bond sales will drain off only part of the excess supply of purchasing power.

Farmers Are Hurt Less by wartime inflation than most other groups. Production of farm products will continue at high levels and increased demand will raise prices. But prices of supplies, machinery and labor that farmers buy will increase. A large volume of business per man will be needed to keep income above expenses.

Big Questions remain to be answered. These will determine the future course of farm prices:

- Has World War III begun? We are now engaged in an undeclared war. If all-out war comes we would have strict and complete price controls. If we continue in a state of high defense spending, we can expect rising prices and rising costs.

- How fast are people going to buy goods ahead that they believe will be scarce later on?

- Will present credit restrictions and taxes stop inflationary buying? Can taxes be high enough to drain off excess purchasing power and stop inflation without destroying the incentive to work? Tax burdens will increase as military spending goes up.

- Will government borrowing be inflationary or deflationary? When it borrows from banks, the bank is given a bond in exchange for a deposit. When the government spends these deposits, the effect is inflationary.

  When it borrows from individuals or corporations by selling bonds, less money is left in circulation. If the government spends this money instead of the people who bought bonds, the effect on our economy is neither upward or downward. If the money is not spent but held in reserve, the effect is deflationary. When bonds are paid off the increased money put in circulation will be inflationary.

- How will weather affect agricultural production? Unusually good weather in recent years has helped make record production possible. Severe drouth would cut food production -- force prices higher.

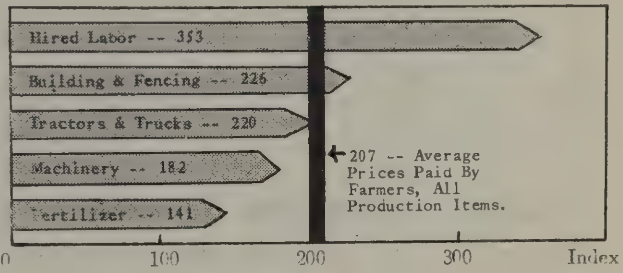
WHAT YOU CAN DO

Sound farm management becomes more important than ever in these critical times. Individually, you can't set prices or costs. But you can manage your operation so that profits can still be made.

☞ Plan for efficient high volume production. It can no longer be just a goal, it is a necessity. Cash expenses take up to 60 cents of every dollar received. The dollar volume of receipts must be high to pay a fair wage to the farm operator and retire his debts.

☞ Buy more of those production items that are relatively cheap and less of the higher priced ones. Labor costs are $3\frac{1}{2}$ times higher than 1935-39; fertilizer and farm machinery prices are less than double.

EFFECT OF INFLATION ON FARM COSTS
October, 1950 (1935-39 = 100)



☞ Select enterprises (especially crops) which use more machinery and less labor. Machinery is low priced compared to labor.

☞ Make full use of every piece of equipment. Properly planned farm buildings become useful production tools. (See pages 334.1-334.10). Make high priced machinery pay its way -- do custom work or step up volume on your own farm.

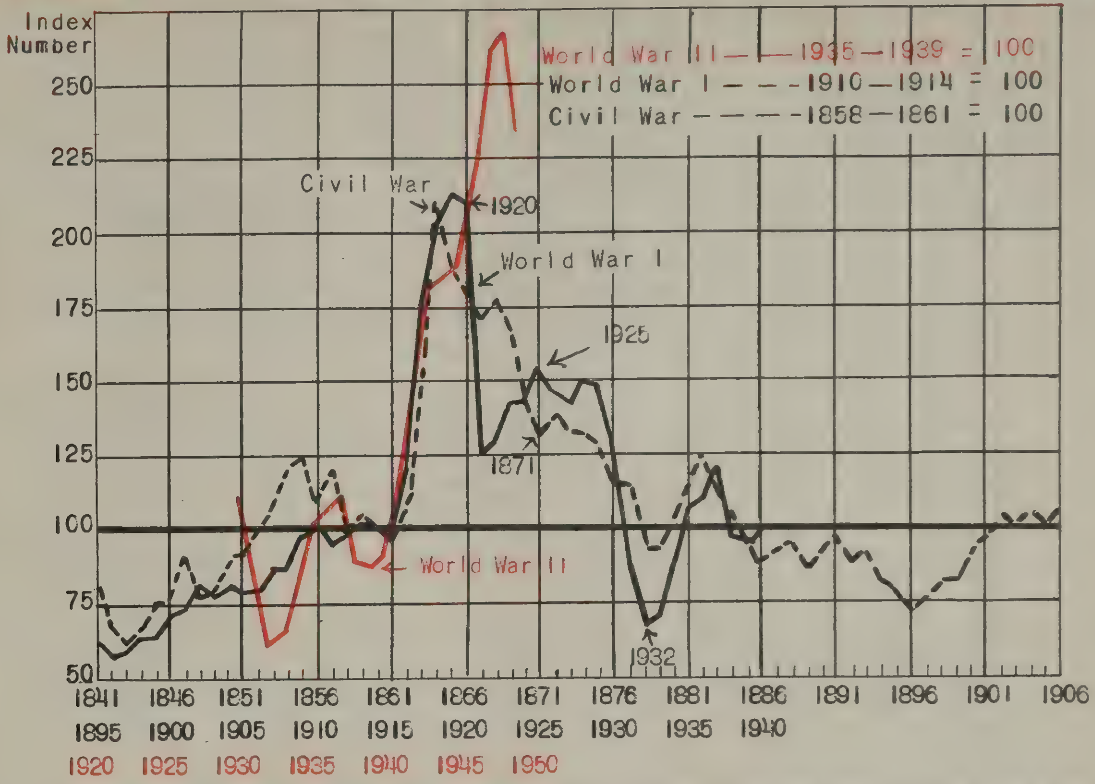
☞ Plan marketing operations to obtain the highest income. With high livestock production, seasonal price peaks will still occur. Store crops till prices recover from the usual harvest time slump.

☞ Keep any extra money invested in productive land, livestock and crops that will grow in value -- idle cash loses purchasing power in times of inflation.

☞ Make needed building and equipment repairs. They will keep your farm enterprises profitable. Improve your soil to maintain a high level of soil fertility. Most of these expenses can be deducted from income taxes.

☞ On tenant operated farms, examine the leasing arrangement to see that tenant and landlord are sharing the burden of increased costs equally.

PRICES OF FARM PRODUCTS AND WARS



INDEX NUMBERS OF PRICES RECEIVED BY FARMERS FOR FARM PRODUCTS IN THREE PERIODS, 1841-1906, 1895-1940 1930-1950

The graph shows what happened to prices received by farmers during 3 major wars -- Civil War, World War I, and World War II. It shows that prices of farm products rise sharply during wars -- fall hard after wars.

Extreme Price Inflation accompanies major wars. Periods of price inflation in this country have always been short and have been followed by long periods of price decline. As a rule, inflation has run its course within one or two years after the end of each major war. The deflation cycle which follows lasts for 30 years or more unless interrupted by another war.

The Down Phase of the price cycle is once again in operation -- but is following a more gradual pattern. The government will continue to try and prevent a violent drop in agricultural prices such as came in 1920-21. But, the effectiveness of government support programs in the face of any world-wide price adjustment is yet to be proved.

Will Depression Come Again? Probably what happened after World War I will repeat itself, at least in part, but it is taking longer and the price drop won't be so sharp or go so far. This time it's a drift, instead of a dive.

Three years after the first War, in 1921, farm product prices had come crashing down. It is now nearly 5 years since World War II ended and prices received by farmers are still relatively high as compared with pre-war.

Prices Are Being Supported at present by the high level of industrial employment, by the demand for housing, for automobiles, etc., by government price supports, by deficit financing of government, by large exports, and by our huge expenses in keeping prepared for war. Trouble will come when some of these factors start showing weakness -- when voters rebel at paying high taxes.

Further Price Inflation instead of deflation and lower prices is forecast by some economists. This is what happened in much of Europe after World War I. It could happen here, and soon, but is not likely.

No serious inflation is probable so long as our output of goods can be expanded -- as it can be today. Big factors that could cause inflation are huge federal government deficits and organized labor monoply. Government costs in 1950 alone will exceed the total for all the pump-priming years of 1933 through 1938.

DOANE AGRICULTURAL DIGEST ® APR., 1950

REVISED

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WHEN PRICES ARE DROPPING ——

Acute farm management problems follow close on the heels of big booms. Farmers cannot prevent a decline in prices, but if they plan carefully they can dodge some of the pain.

Costs go up slower than income when prices are advancing. BUT! When prices start down, costs are sticky. This is the reason for the squeeze which has now developed on farm income. It is the high costs rather than lower prices that are giving most farmers trouble at the present time. Farmers who will be hurt most will be those who have gone heavily in debt, or who farm like they did when the boom was on.

Long Turnovers (length of time from date of planting, birth or purchase to date of sale) favor farmers when prices are advancing. They are a big handicap when prices are going down. Prices may fall drastically during such a period. For example, it takes nine months to produce a calf and another 24 to 27 months before the calf can become a cow and reproduce. When prices are going up, it pays to speculate by holding grain and other farm commodities for high prices. Seasonal price peaks can be disregarded and good profits still obtained. The same selling program when prices are falling can mean BANKRUPTCY.

☞ One-third of the farm operators in the U.S. have had little or no experience farming in a period of prolonged falling prices.

Government Price Supports, at best, are only a crutch to help out while we recover from the fall. They help to relieve the pain, but don't cure the sickness. The danger is that controls will become so strict that good management flexibility and the ability to shift crop and livestock production according to prices will be lost.

The government farm program has without doubt helped to ease the price drop so far. How well it can hold the line in case of a serious decline in the general economy of the nation is questionable. The present control programs have never been tried in a sustained period of falling prices. The old Federal Farm Board spent over 300 million dollars in the years from 1929 to 1932 but could not hold the price line.

Several commodities have sold recently at far below supports. Corn sold freely last fall at 45 cents a bushel under the loan. The egg support program in the Midwest practically collapsed last winter -- when eggs were selling for only one-half the support price.

We will continue to have government price support programs, and they will help prevent disastrous drops in prices farmers receive. However, they should not be expected to guarantee profits to all farmers.

WHAT YOU CAN DO

The future belongs to those who plan to meet the problems that it brings. Farmers as individuals can't do much to keep prices from falling, but these are some things you can do within the farm fences to help maintain profits.

- Work towards the optimum. Get the most pounds of meat, dozens of eggs, and gallons of milk per hour of labor or hundred pounds of feed fed. Keep buildings, machinery and labor profitably employed as many days out of the year as possible.

- Stick with high profit crops and livestock: for example, corn in preference to soybeans, soybeans in preference to oats, etc.

- Keep your operations flexible. Avoid being caught in a profit squeeze due to a rigid pattern of operation that cannot be varied sufficiently to meet shifting conditions.

- Practice soil conservation. Take steps to maintain or increase soil productivity. Rotate crops, control grazing, apply fertilizer, spread manure, reseed pasture, etc.

- Produce what the market wants. The consumers hold the purse-strings.

- Make improvements to buildings and equipment. This will cut down year-to-year cash expenses when crop and livestock prices are lower and money is harder to get hold of.

- Keep well informed about the national outlook for general business activity. Changes in the overall economy mean changes in prices received by farmers.

Financial Security does not depend alone on good farming. It is equally important to build and maintain a good credit standing. Here are guiding principles:

1. File an annual credit report and operating statement with the bank or credit agency that will be called on in case of need.

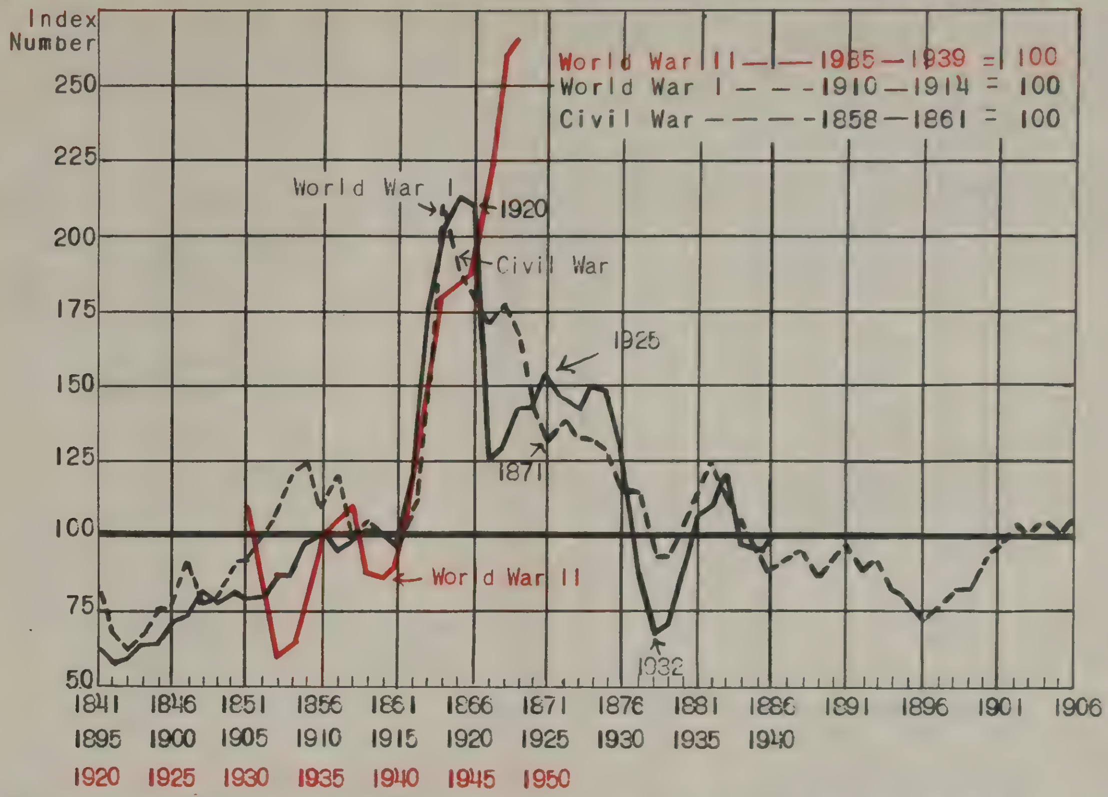
2. Never let old bills accumulate. Borrow for productive purposes only.

3. Take care of notes and other obligations on or before due dates. Pay loans in a definite and practical way.

4. Do not go on another man's note unless willing and able to assume his debts.

Action Based On Reason -- not on emotion or politics -- is the only real basis for building a secure future. Those charged with the responsibility of running a farm or a business should not ignore the lessons learned from other wars and post-war periods.

PRICES OF FARM PRODUCTS AND WARS



INDEX NUMBERS OF PRICES RECEIVED BY FARMERS FOR FARM PRODUCTS IN THREE PERIODS, 1841-1906, 1895-1940 1930-1949

The graph shows comparison in the trend of prices received by farmers during three major wars. It should help clarify thinking about the possible future level of farm commodity prices, assuming that there is not another World War in the near future. (See Digest pages 3, 4, 5, 21, 22, 457, 458).

EXTREME PRICE INFLATION accompanies major wars. When things get out of control as in Germany a year ago, it is necessary to revalue the money or issue new currency and take a new start. Periods of price inflation in this country have always been short and have been followed by long periods of price decline. As a rule, inflation has run its course within one or two years after the end of each major war. The deflation cycle which follows continues for 30 years or more unless interrupted by another war.

MAJOR PRICE CYCLES are world-wide and involve every nation regardless of their political philosophy. The current inflation cycle appears to have passed its peak in 1948. Latest reports show that both inside and outside the United States production is catching up. Inflation lasted longer than usual this time because of the 1947 drouth in the Midwest, crop failures in Europe, and the greater destruction left by the war.

The Down Phase of the price cycle, if it runs true to form, will be sharply downward. The administration will try to prevent a violent adjustment such as came in 1920-21. But, the effectiveness of government support programs and a planned economy under the impact of World-wide change is yet to be proved.

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The graph deserves special attention for reasons such as the following:

1. The drop in prices from the inflation peak is rapid and comes with little or no warning.

2. Every farm and business enterprise should now be put in shape to operate successfully during a long and difficult deflation period.

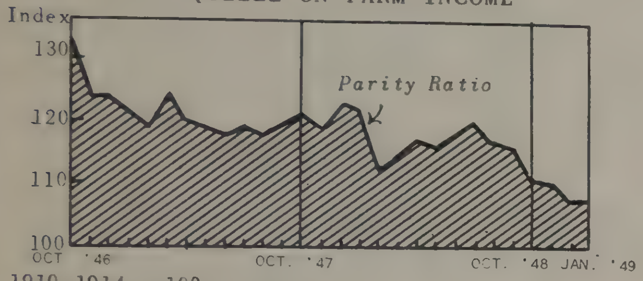
REVISED

WHEN PRICES ARE DROPPING ——

Acute farm management problems follow close on the heels of big booms. Every wage earner and every segment of the nation's economy feel the effect.

Costs go up slower than income when prices are advancing. BUT! When prices start down, costs are "sticky". That is the reason for the squeeze which is now developing on farm incomes.

THE SQUEEZE ON FARM INCOME



1910-1914 = 100

LONG TURNOVERS (length of time from date of planting, birth or purchase to date of sale) favor farmers when prices are advancing. They are a big handicap when the trend is down. When prices are going up, it pays to speculate by holding grain and other farm commodities for higher prices. The same program when prices are falling can mean BANKRUPTCY.

More than two million farm operators have had little or no experience in handling their business in a period of declining prices. With the exception of the winter of 1937-38, prices have held steady or advanced since 1932.

Many farmers hold to the mistaken idea that Government programs will prevent lower prices. The old Federal Farm Board spent millions of dollars in the years from 1929 to 1932, but could not hold prices. The "New Deal" programs have never been tried in a sustained period of declining prices.

Actually, corn has sold almost 1/3 below the support level in recent weeks. New crop wheat for July delivery has sold more than 45 cents under the probable support. You only have to go back to 1944 to know that hog price supports are really very little help in the face of excessive supply. A year ago, Midwest farmers found egg price supports very inadequate.

GOVERNMENT PRICE SUPPORTS, at best, are only a crutch to help out while we recover from the fall. At worst, government farm programs can become a "Frankenstein" that takes away private incentive and individual freedom in the name of stabilized income, price supports, production controls, or conservation of our natural resources.

THE FUTURE belongs to those who plan to meet the problems that it brings. The course that individual farmers should follow is clear. They must work along the following lines to insure highest profits and hold risks to a minimum:

1. Do a good job of soil conservation. Manage your soil and water resources, and make full use of crop rotation, controlled grazing, organic and inorganic fertilizer.

2. Strive for optimum production. Sustained high crop yields and efficiency with livestock and poultry are the two most important factors in profitable farm management. (See Page 521)

3. Produce what the market wants. Other things being equal, handle the class of livestock and grow the crop varieties that consumers like.

4. Make the most of high profit crops and intensive livestock: for example, corn in preference to oats; dairy cattle in preference to beef cattle; and rotation pasture in preference to permanent pasture when conditions permit a choice.

FINANCIAL SECURITY does not depend alone on good farming. It is equally important to build and maintain a good credit standing. Here are guiding principles:

1. File an annual credit report and operating statement with the bank or credit agency that will be called on in case of need.

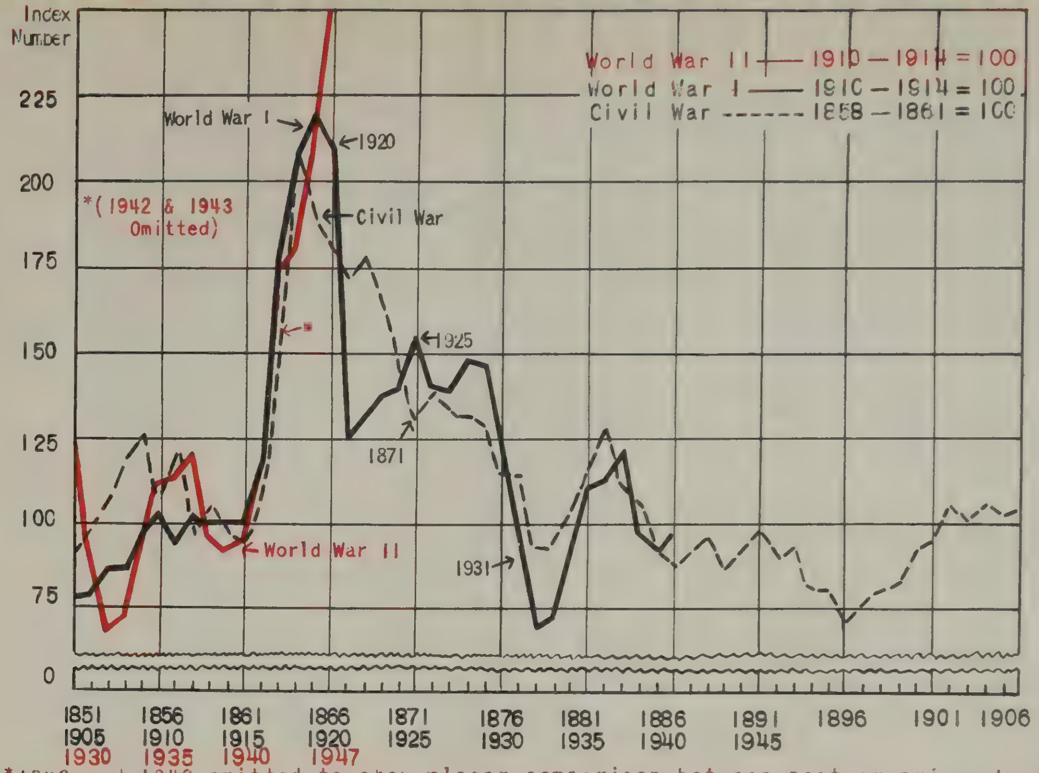
2. Never let old bills accumulate. Borrow for productive purposes only.

3. Take care of notes and other obligations on or before due dates. Pay loans in a definite and practical way.

4. Do not go on another man's note unless willing and able to assume his debts.

ACTION BASED ON REASON -- not on emotion or politics -- is the only real basis for building a secure future. Those charged with the responsibility of running a farm or a business should not ignore the lessons learned from other wars and post-war periods.

PRICES OF FARM PRODUCTS AND WARS



*1942 and 1943 omitted to show closer comparison between postwar price trends.

INDEX NUMBERS OF WHOLESALE PRICES OF FARM PRODUCTS FOR THREE PERIODS, 1851-1906 1905-1940, AND 1930-1947

The foregoing graph is deserving of constant reference and restudy. It should help stabilize thought about possible future price levels of farm products, assuming that the world does not become involved in another devastating war in the near future. (see Digest pages 3, 4, 21 and 22.

Extreme price inflations accompany major wars. The period of inflation is short compared with the prolonged period of deflation. The inflation episode usually lasts only three to five years, whereas the deflation period extends over several decades. The idea is sometimes advanced that we now have a "planned economy" and that, as a result, there will be no recession following the recent war. Back in the early years of the war "the planners" were saying that we could prevent inflation.

Wholesale prices of farm products are compared in the above graph because they are the only prices available for the entire period shown. Index numbers of prices received by farmers offer a more accurate comparison of prices actually paid to farmers because after World War I wholesale prices rose relatively higher than farm prices. After World War II the reverse is true. For example in 1919, the year of highest prices after World War I, farm prices averaged 215 percent of prices in 1910-14. During 1947 the average for the year was 278* per cent of 1910-14.

During the early period of rising prices, costs advance more slowly than income and farmers make abnormal profits. Speculation results because these unusual profits cause many farm operators and businessmen to lose their sense of true values. This further stimulates inflation and causes prices to rise even faster and higher than demand justifies.

The graph deserves special attention for reasons such as the following:

1. The drop in prices from the inflation peak is rapid and comes with little or no warning. Those who speculate during the high-price period may easily get caught with tremendous losses.

2. Every farm and business enterprise should be put into shape to operate successfully during the long difficult deflation period.

Prices have far-reaching significance. The level of farm prices largely controls land value. Inflation in land values is still in progress, with boom prices far above basic values in most farm areas. The average for the nation is now over 50 per cent higher than the 1912-14 level and only 4% per cent below the 1920 peak. Lending organizations are again placing larger loans on some farms than the land can possibly support during a period of deflation.

The most efficient and capable managers may not make the most profits during the remaining months of the boom period, but will come through with a sound business. In the 30 to 40 years of declining prices that history indicates are to follow, these men will continue to make money.

*Based on U.S.D.A. data

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FINANCIAL MANAGEMENT

Acute management problems follow in the wake of major wars. In this period of transition from war-time scarcity to peace-time abundance the entire economy must be adjusted.

The problems of the farm are reflected throughout the entire economic structure. Hence, everyone charged with the responsibility of the management of a business is vitally concerned with these efforts to chart the future of agriculture.

The government has pledged to support the prices of most of the major farm products at 90% of parity, at least through 1948.

A sound, long-time farm program has not yet been developed.

Amid this confusion, the course that farmers should follow is clear. They must direct their efforts along the following lines to insure highest profits and hold risks to a minimum:

1. Produce large crop yields per acre by using more fertilizer, improved seeds, the best of cultural practices, and better harvesting methods.
2. Plant more intensive and high-profit crops. Corn, cotton, and vegetables are examples of high-profit crops.
3. Increase production per cow, sow, ewe and hen.
4. Produce the class of livestock that is best adapted to the farm.
5. Make more use of intensive livestock --dairy and poultry as contrasted to beef cattle and sheep--where conditions permit a choice.
6. Be certain that money spent to increase production will be justified by increased returns.

Farmers should build and maintain a good credit standing while their incomes are high. Here are guiding principles:

1. Pay cash and never let old bills accumulate.
2. Take care of notes and other obligations on or before due dates.
3. Borrow for productive purposes only.
4. File an annual credit report and operating statement with the bank or credit agency that will be called on in case of need.
5. Pay loans in a definite and practical way.
6. Concentrate your financial transactions with one institution.
7. Do not sign another person's note unless willing and able to assume the debt.
8. Do not speculate. In times like the present, it is a poor business policy to hold farm products for higher prices. It is true that many who stored their crops at harvest during the past two years made good profits on later sales. However, those who sold at harvest made a good profit on their operations and limited their risk to a minimum. During this uncertain period, when political decisions, both foreign and domestic, have more influence than usual on the economy of this country, farmers might just as logically sell their crops at harvest and use their money to speculate on the Board of Trade as to store the crops for later sale. Neither action is advisable at this time.

Businessmen dealing with and financing farmers should carefully watch transactions with those farmers who are violating sound business practices. Likewise, farmers should not borrow money from, or otherwise deal with, individuals or companies that are speculating and have an uncertain future.

MANAGEMENT --both farm and business -- is still faced with one of the most difficult problems it has ever had. All-out production is required to relieve the shortages left by war, both at home and abroad. However, once the demand for replacement has been taken care of, and prices fall, industry and agriculture cannot be expected to continue production at the present rate, yet anything short of this will result in unemployment, restricted buying power, and lower prices for farm products.

This new deflation cycle will begin very slowly and will be almost unnoticed at the start. Then, almost without warning we will be jarred back to our senses by the sudden realization that the inflation boom has spent itself--that the bubble has broken--that it is already too late to hedge against deflation. Farm income will decline more rapidly than expenses as soon as deflation sets in. Plans in 1948 should include steps to get farm finances ready for lower prices.

The present high demand for farm products will not continue indefinitely. Action based on reason--not on emotions or politics--is the only real basis for building a secure future. Those charged with the responsibility of the future of a business or farm enterprise should not ignore the lessons learned from other wars and post-war periods.

DEMAND FACTORS — INFLATIONARY

The Korean War has kicked off a serious new inflation cycle. Wage increases are coming thick and fast. Debts are going up. Money in circulation is at a new record high. And, the general price level is back up to the 1948 peaks.

Billions being spent for war material and in support of the Atlantic Pact Nations are creating new buying power -- while at the same time reducing the supply of consumer goods. Allocations are already in effect on some commodities. And, sterner measures are expected soon after the elections.

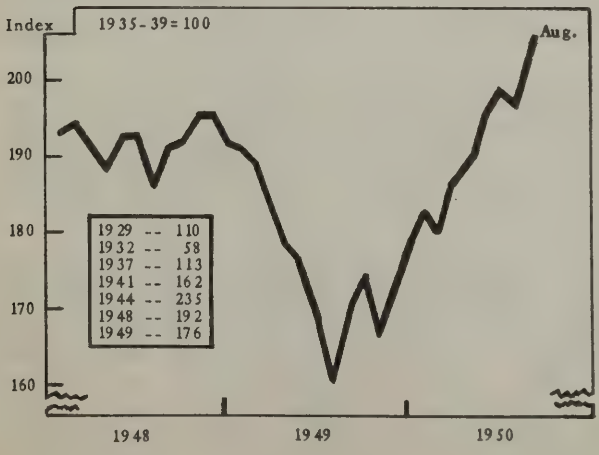
Almost everyone from the housewife, stocking her pantry shelves, to the business man, with a multi-million dollar inventory, feels compelled to buy ahead. Hoarding, as such, probably does not figure big in the present scramble for things. Most extra buying is in a sincere effort to cover real or anticipated needs before prices go still higher.

Yes! These are the early developments in a new war economy. But! It is too early to know how far or how fast inflation will go. The average informed observers estimate an advance of 10 to 20 per cent by January 1952. The size and speed of our war effort depends on political, economic and other considerations in Moscow and in Washington.

To help you keep up with the changing situation watch these important DEMAND FACTORS in the months ahead:

INDUSTRIAL PRODUCTION

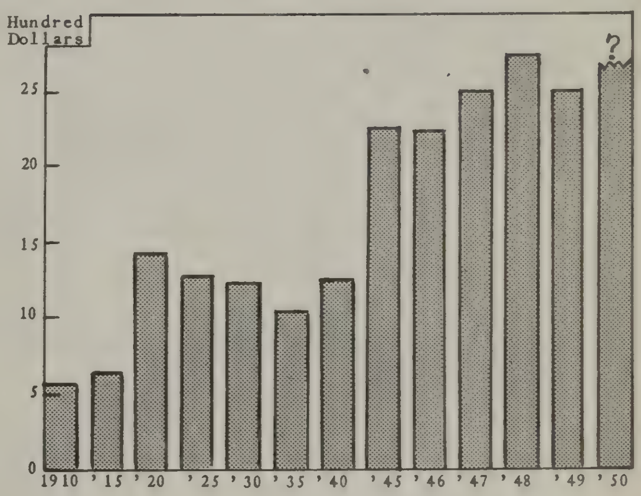
January 1948 -- August 1950



Industrial production is one of the best measures of total national prosperity. The August index stood at 205. This is the highest level since World War II ended in 1945 and compares with the all-time peak of 244 set in one month of 1944. Farms are nearly always prosperous when industrial production is high. Workers have more money with which to buy food and other farm products. In wartime, consumers spend a larger part of their income for food -- they can't buy the other things they want.

WAGES OF INDUSTRIAL WORKERS

1910 -- 1949



Wage rates are now at record levels. This is the result of recent pay boosts and overtime pay -- especially in the construction business and in the durable goods industries like automobiles. The trend will be sharply upward as other workers strive to get their own wages increased before controls are put into effect. Wage increases support the inflationary spiral. They are an important cause of price boosts on the things farmers buy. They also increase the money supply and make it possible for workers to pay higher prices for farm products.

Civilian employment continues to rise. Total employment reached an all-time peak of 62,400,000 in August, reflecting continued expansion in the manufacturing and construction industries. Full employment across the nation means a good solid market for farm products at prices that are profitable to farmers.

The number of unemployed dropped to 2.5 million in August. Most of these were people who were changing jobs. We are fast reaching a condition of "over-employment". Skilled workmen are already at a premium and some "job-pirating" has been reported. Under these

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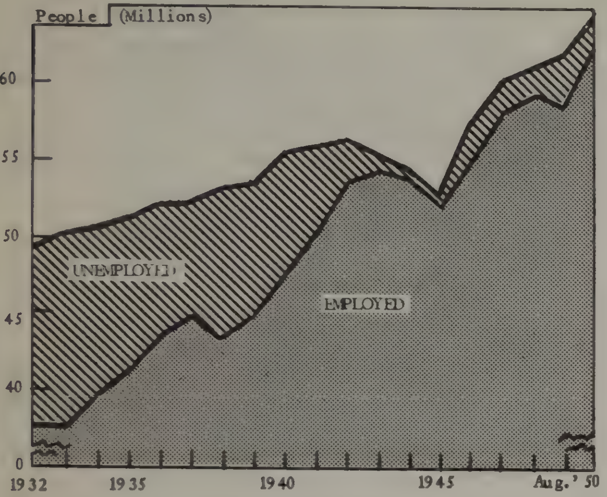
DEMAND FACTORS—INFLATIONARY

TOTAL EMPLOYMENT

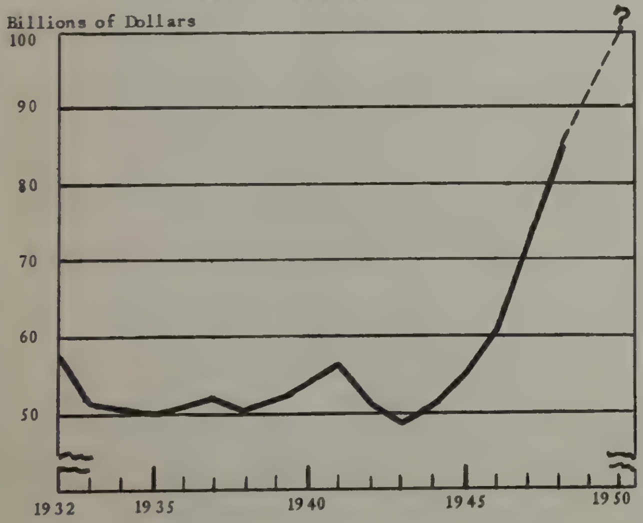
UNITED STATES 1932 to August, 1950



conditions there is a tendency to shirk on the job and let sloppy work get by. Result -- things cost more but the quality is lower.

Going hand-in-hand with wage rates and industrial production is consumer income and use of credit. Strangely enough most of us go into debt during boom times and pay our debts during depression. Personal incomes are now at record levels and people are going into debt at a fast rate.

TOTAL PRIVATE DEBT



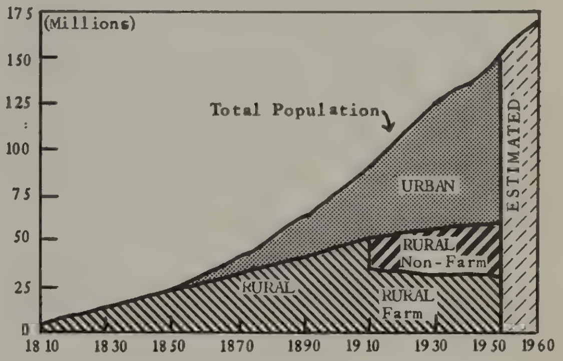
Latest estimates of total individual and non-corporate indebtedness add up to almost $85 billion. But, that estimate is nearly two years old and the total probably exceeds $100 billion today. Consumer Credit alone stands at $21 billion at the present time. At the end of July, 1950 consumers owed $12,608,000,000 on installment credit and $7,732,000,000 on non-installment credit.

Total debts are not excessive in relation to total income, however. Debts do not really hurt until they have to be paid. Thus, with personal incomes at record levels, the debt load is still far below the breaking point. What we have done is to commit ourselves to a very high and rising level of income.

The baby boom which slowed down in 1948, 1949, and early 1950 may be off to a new start. Marriages are on the increase and more babies mean increased future demands. Our old folks are living longer, too -- with improved medicines to combat disease and better living standards. The combination of the two will result in a rapidly expanding demand for farm products in the next ten years.

POPULATION GROWTH IN UNITED STATES

1810-1950 Census Totals 1951-1960 ESTIMATES (B. of L.)



TAXES -- TAXES

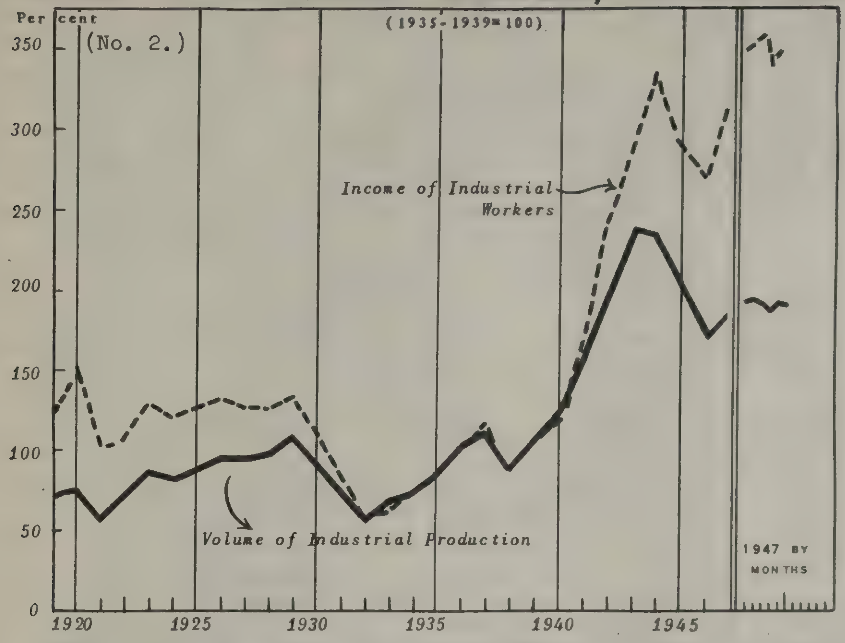
About the only factor on the minus side of the demand situation is taxes -- income taxes, real estate taxes, sales taxes, luxury taxes, hidden taxes, licenses, and taxes and taxes.

Taxes are rising rapidly as the cost of government, war, and public services mount. But, money paid out in taxes is not lost. It shows up somewhere else. The main difference is that somebody besides you gets it in wages or through a government contract of some kind.

Taxes are approaching dangerously high levels, however. They take about 28 per cent of our gross national income and to balance the budget would take much more. History shows that 40 per cent is just about the breaking point -- that when taxes go higher than that lots of people begin trying to live off of the government instead of working. This leads to rapid inflation of prices because when people are not working as hard as they should, they produce less. And naturally, there is less to buy. Possibly the 40-hour work week, production controls on farmers, and the large number of days lost by strikes every year fits somewhere into this picture of rising tax rates.

DEMAND FACTORS

VOLUME OF INDUSTRIAL PRODUCTION AND INCOME OF INDUSTRIAL WORKERS, U.S.1919-1948

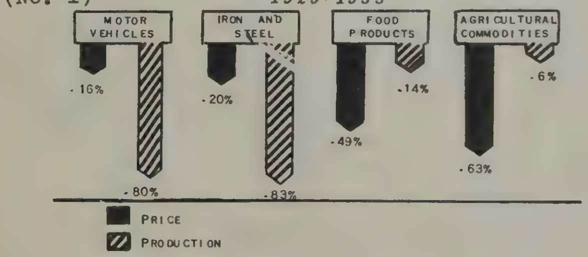


SOURCE: U.S.D.A., B.A.E. INCOME OF INDUSTRIAL WORKERS INCLUDES WAGES OF FACTORY, MINING AND CLASS 1 RAILWAY EMPLOYEES.

In a comparatively free economy such as we have in the United States, the price of any product depends largely upon the supply of, and the demand for that product. Farm production has been remarkably stable. The opposite is true with farm prices.

During the years following the 1929 crash the automotive and steel industries cut production as much as 80 per cent to keep their prices up. The food producing industries with an inelastic demand decreased production by only 10 per cent and their prices were cut in half. See graph (No. 1) below.

PRICE AND PRODUCTION CHANGES IN DEPRESSION
1929-1933



SOURCE: SENATE DOCUMENT NO.13, 74 CONGRESS, 1ST. SESSION

During 1947 and the first half of 1948, the demand for agricultural products continued at a high level because; industrial production was at a record peacetime level, a high rate of employment and consumer income was maintained, exports were large, and the short crops of 1947 caused feed and food shortages in many areas.

The graph (No.2) at the top shows two broad measures of demand for agricultural products. Industrialists make extensive use of farm products, and industrial workers, when employed, buy much more freely the food, clothing and other products originating on the farms.

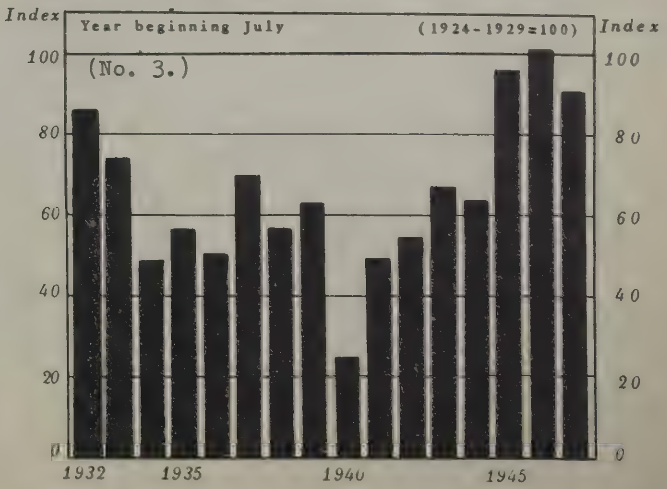
At present U.S. employment is at a record high of 61,500,000 workers, being paid the highest wages in history, but the increased cost of living has offset all or most of the gains made in the past year. As a result, the demand for agricultural products remains at, or near, the 1947 level. With prices at peak levels in nearly all fields of industry, the worker's dollar cannot stretch to meet all of his needs and wants. As this happens, prices in the lines affected must decline if supply remains the same. However, even at present prices, the average wage of an industrial worker will buy 20 per cent more food than it did before the war.

Industrial workers are a large segment of the urban population. Over a period of time, any changes in their income will be reflected in the prices of farm commodities because the demand for farm products depends largely upon buying power in the hands of consumers.

The graph (No. 3) below, pictures the yearly volume of agricultural exports since 1932. Exports declined rapidly during the thirties, but because of the war, they rose from 1941 through 1946 and the volume of exports again approached that of the late 1920's.

In 1947 a downward trend in exports set in again. Europe harvested her first good crops since the war in the autumn of 1948. Even with the Marshall Plan, exports are declining and are more on a commercial basis with less dependence upon relief.

QUANTITY OF U. S. AGRICULTURAL PRODUCTS EXPORTED, 1932 - 1947

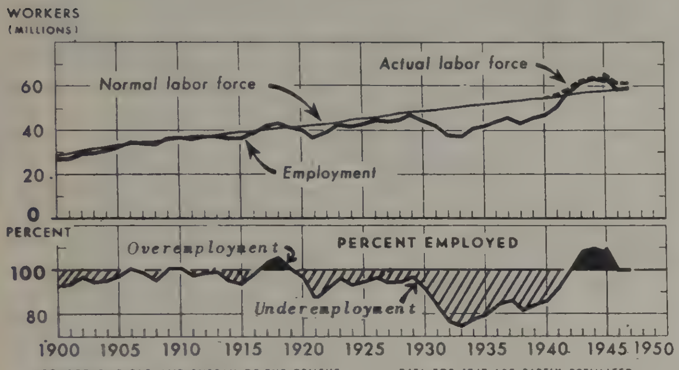


Based on data for 74 agricultural export classifications.
SOURCE: U.S. DEPARTMENT OF COMMERCE

DEMAND FACTORS

(No. 4)

NORMAL LABOR FORCE, EMPLOYMENT, AND EMPLOYMENT AS A PERCENTAGE OF THE NORMAL LABOR FORCE IN THE UNITED STATES, 1900-1947



SOURCE: BAE, BLS, AND BUREAU OF THE CENSUS DATA FOR 1947 ARE PARTLY ESTIMATED

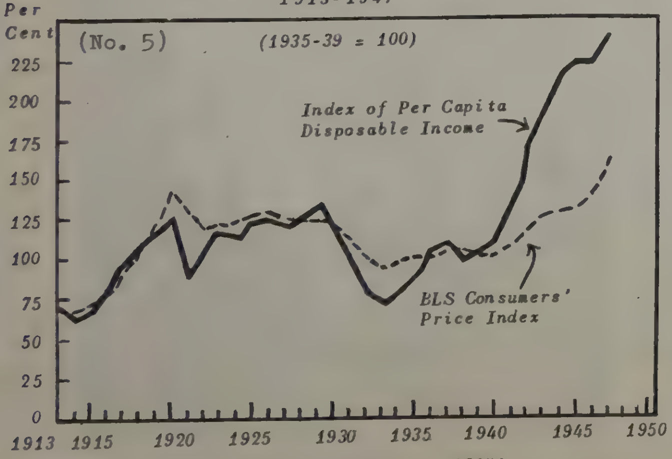
The graph (No. 4) above, pictures employment and unemployment in relation to the normal labor force. The labor force is continually growing as is shown by the trend line in the upper section of the graph. The substantial increase in the actual labor force during the war, which was the result of a larger percentage of women working and of older people postponing their retirement,has largely been removed. These people are not considered as unemployed since leaving their jobs but the net effect has been to reduce the total number of wage earners.

At the present time unemployment is at a minimum, slightly more than 2,000,000 as compared to the more than 12,000,000 in the early thirties. Since employed workers buy freely, this is a hopeful sign.

Per capita disposable income, another good indication of demand, is at a record level. The graph below (No. 5) shows the level of per capita disposable income as compared with the Bureau of Labor Standards Consumer's Price Index through 1947. This graph indicates that money available for spending is still very high, but that the spread between cost of living and income is getting smaller. As long as disposable income remains above the price index,the demand for agricultural products will remain strong

PER CAPITA DISPOSABLE INCOME AND CONSUMERS PRICES

1913-1947



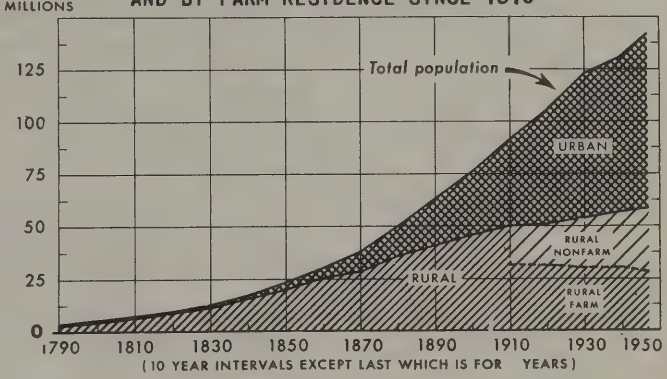
SOURCE: VALLEY NATIONAL BANK, PHOENIX, ARIZONA

The graph below, (No. 6) shows that the population has grown rapidly since 1790. Another significant factor, is the increased rate of growth since 1941. The birth rate before the war was about 18 births per thousand; it increased to 20 during the war and for the year 1947 jumped to 25.9, a record high. The baby boom is not over. The total births in 1948 will be second only to 1947. At the same time, the life expectancy of the population is increasing -- people are living longer.

In terms of demands for farm products more babies mean more growing children with heavy demands for milk, meat, eggs and other growth foods. More old people means a growing need for fruits and vegetables and a shift away from heavy foods such as potatoes, other starches and fats.

On the supply side, agricultural production has increased 278 per cent since 1870 and is now going up at an increasing rate. Population has increased 241 per cent in the same period, but is now going up at a decreasing rate. This means that the demand for farm products has also been increasing at a decreasing rate. Per capita consumption is a relatively stable factor, remaining practically constant from 1913 up to the beginning of the war. Since the year 1940, however,per capita consumption per year has averaged somewhat higher.

(No. 6) POPULATION GROWTH IN THE UNITED STATES, 1790 TO 1947 BY URBAN-RURAL RESIDENCE AND BY FARM RESIDENCE SINCE 1910



SOURCE: BUREAU OF THE CENSUS WITH 1910 RURAL-FARM POPULATION ESTIMATED
BUREAU OF AGRICULTURAL ECONOMICS

Total agricultural production has been increasing about 1 per cent per year since 1913 and has reached new all time highs during recent years. Production per farm worker has been increasing at a rate of more than 3 per cent per year since 1940. Growth in population, .7 per cent per year, has not kept pace with increasing production.

Before the war huge surpluses of corn,wheat, and cotton were accumulating. These were used up during the war but will begin to accumulate again out of this year's huge crop. Surpluses, whether in the hands of farmers,industry or government, have a pronounced depressing effect on the prices received by farmers.

DEMAND FACTORS

The words SURPLUS, SURPLUS, SURPLUS loom up every day before those of us in agriculture. They leap at us from the newspapers; they boom at us from the radios. This is that monster, SUPPLY, who has been adorned with forked tail and horns and is supposedly ready to move in and devour all of us poor farmers. DEMAND is just as, if not more, important in determining the price of our products.

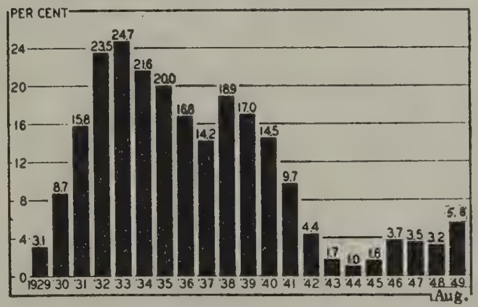
During 1947 and most of 1948, the demand for farm products continued at a high level. Prices received by farmers were high. Surplus worries were relatively few. However, beginning with the last half of 1948, the demand for farm products has slackened considerably. Several factors enter into the overall demand picture.

EMPLOYMENT

Unemployment increased sharply during the summer, but has now started to decline. The following chart shows that we are still in good shape, as compared to past years.

The danger point at present is generally held to be 5 million unemployed. This would be roughly 8 per cent of the labor force. At present, 6 per cent are jobless.

UNEMPLOYMENT IN RELATION TO U. S. LABOR FORCE, 1929-49
(Unemployed as Per Cent of Total Labor Force)



Full employment across the nation means a good solid market for farm products at prices that are profitable to farmers. When employment drops, it means less buyers and less dollars to compete for the food, fiber and other products produced by farmers.

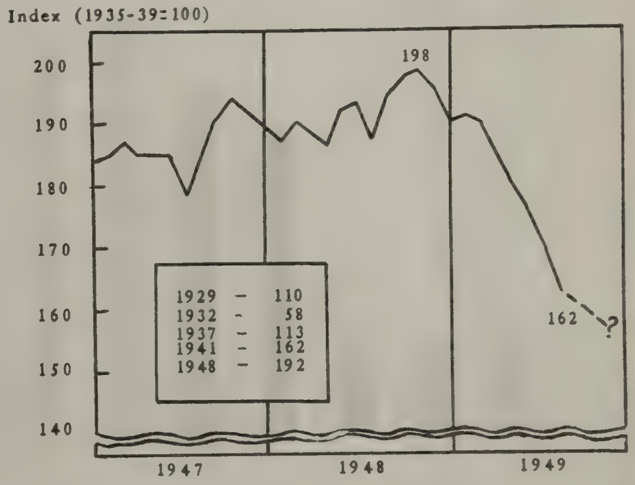
It takes money to eat, and when men lose their jobs and most of their income belts are tightened and grocery bills are cut. The only way these people can buy more is for prices to be lowered -- and that is what happens.

INDUSTRIAL PRODUCTION

Volume of industrial production is one of the major keys to the general health and wealth of the economy.

Past experience has shown us that farming is prosperous when other business is prosperous. When industrial production is high the workers are making the money to buy the meat and the crops produced by farmers.

INDUSTRIAL PRODUCTION
January 1947 -- July 1949



A drop in industrial production means that less people are working -- that paychecks are smaller. This means a slackening in demand for farm products -- and lower prices to farmers.

The first half of 1949 saw a sharp drop in the index of industrial production. The index dropped from a high of 198 per cent of the 1935-39 average in October 1948 to 162 last July.

The volume of production started climbing upward again in August and has received a further boost in September.

Extended STRIKES in the big industries, such as steel, coal and automobiles, would reverse the present upward swing in industrial production and start it down again. Net result would be a further downward pressure on farm prices.

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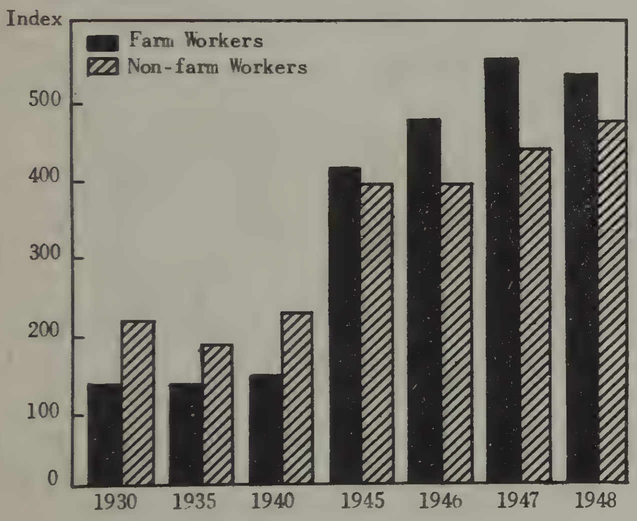
DEMAND FACTORS

WAGE RATES AND EARNINGS

Changes in the wages of industrial workers are reflected in the price of farm commodities, because the demand for what farmers produce depends largely upon buying power in the hands of consumers. However, big wage boosts when the general trend of business is down may force more people out of a job.

Wage rates are at a record level, notwithstanding the slow-down in production and employment.

INCOME OF FARM AND NON-FARM WORKERS
U.S. 1930 - 1948
(Index - 1910-1914 - 100)



EXPORTS

Farm exports will continue above prewar for the next few years. However, we are due for a continuation of the decline which began earlier this year.

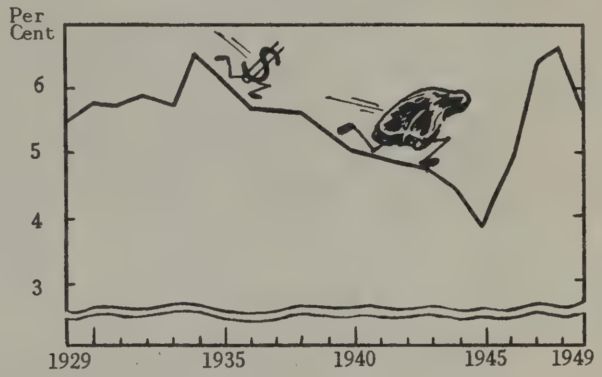
The drop in exports will become much greater as more shipments are put on a commercial basis and we continue to cut down on relief activities. ECA thinks it will take 20 per cent less farm produce in 1949-50 than in 1948-49. Exports of wheat, for example, will be between 50 and 100 million bushels below what they were last year.

As shipments of farm products to foreign countries drop, more of these products are put on the market here -- and the price falls.

BUYING HABITS

Also of great importance in the overall demand for a product are the buying habits of consumers. The principal reason for the high level of livestock prices in 1947 and 1948 was the strong consumer demand for meats. Not only did consumers have more money than ever before -- but they also spent a larger than usual proportion of their increased incomes for meat.

PER CENT OF CONSUMER INCOME SPENT
FOR MEAT, U.S. - 1929-1949



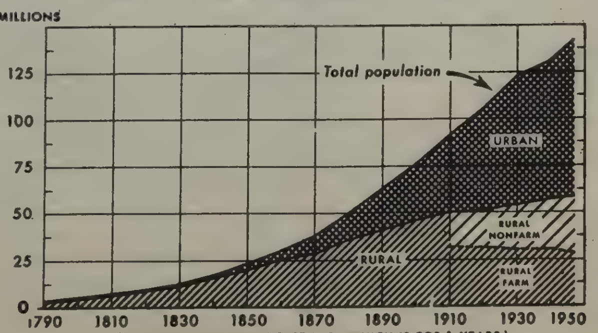
POPULATION

The baby crop is still coming along at a fast pace, but has slowed down from its peak of 1947. The baby crop hit three and nine-tenths million in 1947; will be about three and one-third million this year.

But even with this boost in "new eaters", the number of U.S. consumers has increased only 14 per cent since 1939. Production of all farm products is 29 per cent higher than in 1939.

Thus what has happened is that our production of farm products has increased much faster than our production of people to consume these products.

POPULATION GROWTH IN THE UNITED STATES,
1790 TO 1948 BY URBAN-RURAL RESIDENCE
AND BY FARM RESIDENCE SINCE 1910



(10 YEAR INTERVALS EXCEPT LAST WHICH IS FOR 8 YEARS)

SOURCE: BUREAU OF THE CENSUS WITH 1910 RURAL-FARM POPULATION ESTIMATED
BUREAU OF AGRICULTURAL ECONOMICS

PARITY AND PARITY PRICES

Parity is a yardstick defined by Congress for measuring the relationship between the prices of farm and non-farm commodities. The price is said to be at "parity" when a given unit (bushel, pound, dozen, ton) has the same purchasing power as it had in the base period.

For example, if a farmer receives parity price for a bushel of corn, he is supposed to be able to take the money and buy as much with it as he could back in 1910-14 (the base period.) If the price of non-agricultural products doubles, the parity price of farm products also doubles -- to keep in line.

How many dollars you receive for what you sell isn't nearly as important as what you can buy with those dollars. A price of $5 a bushel for wheat, if only 80 per cent of parity, isn't as desirable as $2 if it is 100 per cent of parity.

PARITY RATIO

Each month the Department of Agriculture computes a parity ratio as well as parity prices for individual commodities. This parity ratio measures the over-all purchasing power of agricultural commodities.

Calculation of the parity ratio is made by dividing the index of prices received by farmers by the index of prices paid, interest, taxes and wage rates.

Parity Ratio For March 15, 1953	
Index of prices received by farmers	264
Parity Index (Index of prices paid, interest, taxes and wage rates)	281
Parity Ratio (264÷281)	94

When the parity ratio is below 100, as it was in March, it means that farmers generally are not receiving parity for the products they sell. There may be individual commodities above parity but all commodities together do not equal parity.

PARITY INDEX

The index of prices paid by farmers is a yardstick which measures changes in the price level of the commodities a farmer must buy. It is also called the parity index. The parity index does not measure changes in production costs of farmers.

Two indexes have been in use since 1950:

The index of prices paid by farmers including interest, taxes and wage rates paid to hired labor is used to compute new parity prices, the parity ratio and transitional parity.

The index of prices paid by farmers, including interest and taxes, is used to compute parity prices for commodities still using old parity and for determining transitional parity. This "old" index is still being reported each month in Agricultural Prices.

THE OLD PARITY

The base period used in figuring the parity price of some farm products is 1910-14. This base was selected because it was felt that price relationships between farm and non-farm products were fair to both farmers and non-farmers during this period. However, the weakness of using a historic base is that it gets more and more out of date with each passing year.

Before 1950 the parity formula based on 1910-14 was used to:

- Determine the relationship between farm and non-farm prices.
- Determine price relationships between individual commodities.

For about one-third of the commodities the base period used was the 60 months between August 1909 and July 1914. For the remaining two-thirds, a post-World War I base period was used.

Parity price determination is simple under the old system. The base period price is multiplied by the index of prices paid by farmers, interest and taxes. For corn the calculation would be as follows; base period price, $.642 x 275 (March 15 index of prices paid by farmers, interest and taxes) equals $1.77.

THE NEW PARITY FORMULA

It became obvious that the original parity formula needed to be brought up to date. Numerous changes in the production, marketing and consumption of agricultural commodities have occurred since 1910-14. These developments changed price relationships so that some commodities, mainly livestock, were higher in price compared with most crops than they were in the base period.

The Agricultural Acts of 1948 and 1949 contained the provisions for changing to the new or modernized parity formula. The new formula was designed to maintain the over-all relationship which existed in 1910-14 between prices received and prices paid by farmers. At the same time it reflects a more normal relationship between the parity prices of individual farm commodities.

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PARITY AND PARITY PRICES

The two major changes made in the formula to accomplish the objectives were:

- Change the base period for individual commodities to the latest ten-year period prior to the year in which the parity price is computed. For example the ten-year period used in 1953 would be 1943-52. Corn, wheat, cotton, and peanuts are exempt from this provision.

- The index of prices paid by farmers was revised to include farm wage rates. At the same time as this addition was made the index was completely revised to take into consideration the changes in amount and kind of products purchased.

EFFECTIVE PARITY PRICE FOR SELECTED FARM PRODUCTS
Base Period, and Base Period Price Shown

Commodity	Base period	*Base Price	Parity Price March, 1953
Basic Commodities			
COTTON, AM.LB.	1909-14	$.124	$ .3410
WHEAT, BU.	1909-14	.884	2.43
RICE, CWT.	1943-52	1.92	5.40
CORN, BU.	1909-14	.642	1.77
PEANUTS, LB.	1909-14	.048	.132
TOBACCO, BURLEY TYPE 31 LB.	1943-52	.185	.52
Designated Non-Basic Commodities			
POTATOES, BU.	1943-52	.589	1.66
TUNG NUTS, TON	1943-52	35.60	100.00
BUTTERFAT, LB.	1943-52	.267	.75
ALL MILK, WHOLESALE CWT.	1943-52	1.68	4.72
MOHAIR, LB	1943-52	.27	.759
WOOL, LB.	1943-52	.21	.590
HONEY, LB.			
COMB	1943-52	.113	.318
EXTRACTED	1943-52	.0589	.166
Other Non-Basic Commodities			
BARLEY, BU.	1943-52	.488	1.37
BEANS, DRY EDIBLE, CWT.	1943-52	3.18	8.94
FLAXSEED, BU.	1943-52	1.62	4.55
OATS, BU.	1943-52	.317	.891
RYE, BU.	1943-52	.605	1.70
GR. SORGHUM, CWT.	1909-14	1.21	2.66**
SOYBEANS, BU.	1943-52	.996	2.80
ORANGES, BOX	1919-28	2.29	3.38**
BEEF CATTLE, CWT.	1943-52	7.58	21.30
EGGS, DOZ.	1909-14	.215	.473**
HOGS, CWT.	1943-52	7.30	20.50
LAMBS, CWT.	1943-52	8.19	23.00
TURKEYS, LB	1943-52	.137	.385

* Some base period prices seasonal averages, others monthly average.

**Transitional Parity in effect.

Prices paid by farmers March 15, 1953:
Revised index 281
Unrevised index 275
.. BUREAU OF AGR. ECONOMICS

Use of the new parity has resulted in an increase in parity prices for most livestock and a decrease in parity price for many crops. The method of figuring parity is slightly different under the new formula than under the old.

First we must figure the average price farmers received for the period 1943-52. For rice this price is $4.45 per cwt. Index of prices paid by farmers during this same ten-year period was 232. Then we divide 4.45 by 232 which gives us $1.92, the adjusted base period price. This $1.92 is multiplied by the latest index of prices paid by farmers, interest, taxes and wage rates, (281 for March, 1953) and the result is $5.40, the new parity price for rice.

This is all figured out and reported monthly by commodities in the publication 'Agricultural Prices' released by the Bureau of Agricultural Economics in Washington, D.C. This bulletin is available on request at the end of each month for any who have a special use for the information.

TRANSITIONAL PARITY PRICE

The change from old parity to new parity reduced the prices on some commodities severely. As a means to cushion this drop "transitional parity" permits the parity prices of non-basic commodities to be adjusted downward gradually. Under the provision of the law the effective parity price of a non-basic commodity cannot be less than the following percentages of its old parity price.

1950	95 per cent
1951	90 per cent
1952	85 per cent
1953	80 per cent

During 1953, transitional parity is in effect for the following commodities; buckwheat, grain sorghums, hay, sweet clover seed, grapefruit, lemons, oranges, avocados, dates, filberts, pecans, walnuts, asparagus, peas, and popcorn.

Old parity is still in use for some of the basic agricultural commodities. The Agricultural Act of 1949 stated that the parity price for any of the basic agricultural commodities, corn, cotton, wheat, peanuts, rice and tobacco, shall not be less than parity price as computed by use of the old parity formula. Corn, wheat, cotton and peanuts come under this provision. Unless new legislation is enacted parity prices for these commodities must be computed with the revised formula after Jan. 1, 1956.

USES FOR PARITY PRICES

- Measure change in purchasing power of a commodity.

- Determine price support levels. Legislation authorizing the Department of Agriculture to support prices of agricultural commodities does not specify dollar and cents levels. Instead, it indicates that prices be supported at a certain percent of parity.

- Determine legal minimum prices for price ceilings. For most commodities the legal minimum was parity price.

- Determine the need for marketing agreement and orders.

PARITY AND PARITY PRICES

What is parity? It is a term used to express the relationship between the price of things that farmers buy compared to the price of the products which they sell. For example, if a farmer is receiving parity price for a bushel of corn, he is supposed to be able to buy just as much with the money he received as he could have during the period on which the parity price is based.

The so-called "base-period" for determining the parity price of most farm products is 1910-14. The reason for selecting this period was that during these years farm income had a fair relationship to non-farm income. Other base periods are used for some farm products, mainly because satisfactory data was not available for them during the 1910-14 period. The 10-year period from 1919 to 1928 is used for a number of commodities.

Parity prices are important to farmers because practically all price supports for farm products are based on a percentage of parity. Price supports are currently in the news background because of the current high price of most farm commodities. However, they may play an important part in the years ahead in determining the prices farmers receive for their products.

BASIC AND STEAGALL

Below are listed the "basic" and "Steagall" commodities. "Basic" commodities are guaranteed price support by loans at 90 per cent of parity, with the exception of cotton which is supported by loans at 92.5 per cent of parity. The "Steagall" commodities are pledged support at 90 per cent of parity, in so far as funds are available, and by whatever method the Department of Agriculture deems advisable.

Support prices for many of the above commodities are established on a yearly basis, and are figured on the basis of the parity price as of the date shown in table 1.

TABLE 1. BASIC AND STEAGALL COMMODITIES

Commodity	Date on Which Support is Based
BASIC	
Corn	Sept. 15
Wheat	June 15
Rice	July 15
Tobacco flue-cured	June 15
Other types	Sept. 15
Peanuts (for nuts)	July 15
Cotton	July 15
STEAGALL	
Hogs	March 15 Sept. 15
Eggs	Monthly
Chickens (over 3½ lb. live-weight)	Variable
Turkeys	Sept. 15
Milk	Variable
Butterfat	"
Dry Peas	"
Dry Edible Beans	"
Soybeans (for oil)	"
Peanuts (for oil)	July 15
American-Egyptian Cotton	July 15
Potatoes	Variable
Sweet Potatoes	"

The law authorizing price supports for "basic" and "Steagall" commodities also " declares it to be the policy of Congress that the lending and purchasing operations of the Department of Agriculture shall be carried out so as to bring the price and income of producers of other commodities to a fair parity relationship with the basic commodities and the Steagall commodities;" (U.S.D.A.) The U.S.D.A. has used this authorization frequently to support the prices of other commodities. For example, flaxseed, sugar beets and sugar cane are now supported at a price which is intended to encourage increased production. As prices of other farm products drop below parity levels, the U.S.D.A. will probably authorize some form of support for them if funds are made available.

Index numbers are referred to frequently in this discussion. An index number compares prices at a specific time to those in a selected or "base" period. For example, the index number of prices paid by farmers shows the percentage increase or decrease in those prices as compared to the average prices paid during a base period. The index number of prices paid by farmers as of May 15 was 229 when compared to the 1910-14 index base of 100. This means that prices paid on May 15 were 229 per cent of the 1910-14 average, or 2.29 times as high.

Index numbers are always expressed as a percentage. For this reason, whenever any number is multiplied by an index number, the result should be divided by 100 to get the decimal in the right place.

HOW TO FIGURE PARITY PRICES

Here are the facts needed to determine the parity price of a commodity:

1. The average price during the base period. (See Table 2) Using corn as an example, base period price is 64.2 cents per bushel. This is the 5-year U.S. average price received by farmers for the base period.
2. The index of prices paid by farmers for goods they need for production and for family living. This index is published for several base periods by the U.S.D.A. and we report the index based on 1910-14 prices and 1919-28 prices to you monthly in the table on page 51. The index for 1910-14 includes an adjustment for interest and taxes paid by farmers.
3. Prices for eggs, milk and butterfat are corrected each month for seasonal variation, so to calculate the parity price in a given month for these products it is necessary to use the figures given in Table 3.

For most products, all that you need to do to figure the parity price for a given month is to take the base period price from Table 2 and multiply it by the appropriate index of prices paid:

EXAMPLE - the base period price for hogs is \$7.27 per cwt. On May 15 the index of prices paid was 229. Multiply \$7.27 times 229 (divide by 100 to get the decimal in the right place) and the result is \$16.65. (\$7.27 x 229 ÷ 100 = \$16.65). This is the parity price of hogs on May 15.

PARITY AND PARITY PRICES

For eggs, milk and butterfat follow the same procedure as above and then multiply your result by the correct seasonal factor taken from Table 3.
EXAMPLE - the base period price of eggs is 21.5 cents per dozen, and on May 15 the index of prices paid was 229. (21.5 x 229 ÷ 100 = 49.2 cents). From Table 3 take 86%, - the seasonal correction factor for May - and multiply this times 49.2 cents. (86 x 49.2 ÷ 100 = 42.3 cents). The result is 42.3 cents, which is the parity price of eggs for May.

You will notice that several items in Table 2 have a 10-year base period, 1919 - 28. To figure the parity price of these products take the base period price from Table 2 and multiply it by the index of prices paid based on 1919-28, as reported in the monthly table on page 51:
EXAMPLE - the base price for potatoes is $1.12 per bushel. Multiply this by 151, the index of prices paid in May compared to 1919-28, and the result is $1.69. ($1.12x151 ÷ 100=$1.69). This is the parity price of potatoes on May 15, 1947.

TABLE 2. **BASE PERIOD PRICES**

Commodity and Unit	Parity is based on these →	Average base period prices	Base period
Wheat, bu.		$ .884	1910-14
Rye, bu.		.720	"
Rice, bu.		.813	"
Corn, bu.		.642	"
Oats, bu.		.399	"
Barley, bu.		.619	"
Sorghum, Grain, cwt.		1.21	"
Hay, ton		11.87	"
Cotton, lb.		.124	"
Cottonseed, ton		22.55	"
Soybeans, bu.		.96	"
Peanuts, lb.		.048	"
Flaxseed, bu.		1.69	"
Potatoes, bu.		1.12	1919-28
Sweetpotatoes, bu.		.878	1910-14
Beans, dry edible, cwt.		3.37	"
Tobacco*, lb.			
Flue-cured		.229	1934-38
Burley		.222	"
Apples, bu.		.96	1910-14
Grapefruit, box		1.25	1919-28
Oranges, box		2.29	"
Lemons, box		2.02	"
Hogs, cwt.		7.27	1910-14
Beef cattle, cwt.		5.42	"
Veal calves, cwt.		6.75	"
Lambs, cwt.		5.88	"
Wool, lb.		.183	"
Butterfat, lb.		.263	"
Milk, wholesale, cwt.		1.60	"
Chickens, live, lb.		.114	"
Eggs, doz.		.215	"

*There are a number of other types, in addition to those listed.

USING PARITY PRICES

There is no point in determining the parity price of a commodity for each month of the year, except to find out how the actual price being paid for that commodity compares to it's parity price; that is, the price that is supposed to give it the same buying power it had in the base period.

By following the procedure outlined above, you will be able to determine, within reasonable limits, what the support price for a commodity will be months before the actual support price is announced by the government. This knowledge will be very helpful to farmers in planning their farm program, to lending agencies in determining how much to loan and on what farm commodities to make loans, and to processors and others in planning future operations.

The index of prices paid by farmers (the factor that determines changes in parity prices from month to month) does not fluctuate very rapidly, so it is possible to estimate fairly accurately what it will be for several months in advance. To illustrate, let us assume that the index of prices paid will decline to 225 by July 15 from the May15 figure of 229. This figure would then become the basis for estimating the support price of cotton for next year because cotton support is based on it's parity price as of July 15. The base period price of cotton is 12.4 cents per pound. (12.4 x 225 ÷ 100 = 27.9¢ per lb.) the estimated parity price of cotton on July 15. Since cotton is supported at 92.5 per cent of parity, multiply 27.9 cents by 92.5 and the result is 25.8 cents. (27.9 x92.5 ÷100 =25.8), which would be the national average support price based on the assumption that the index of prices paid will decline to 225 by July 15. This same procedure can be applied in calculating support prices for other commodities.

CAUTION

Support prices vary by areas so you need to know how support prices being applied to your local area compare to the national average before you can estimate the local support price.

"Steagall" commodity supports are not mandatory or definitely defined. Major qualifications are --

1. "In so far as funds are available", and
2. "By whatever method the Department of Agriculture deems advisable."

Congress must appropriate the money needed for price supports. Prominent congressmen have called attention to this fact in the past -- and congress is becoming more economy minded.

TABLE 3. **SEASONAL FACTORS FOR EGGS MILK AND BUTTER**

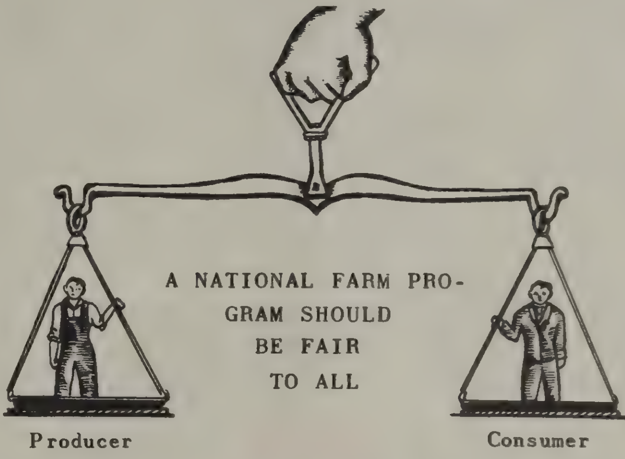
Commodity	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Eggs	104	90	85	85	86	90	96	101	106	114	122	121
Milk, Wholesale	105.9	102.7	98.4	93.8	90.0	89.0	93.0	98.0	103.0	106.7	110.1	109.4
Butterfat	103.9	102.5	101.5	99.0	94.7	91.6	93.4	95.1	99.4	103.2	106.2	109.5

A NATIONAL FARM PROGRAM

It is generally agreed that the present National Farm Plan is far from perfect. To stimulate thinking, the following suggestions are being offered by the Doane Agricultural Service. The basic ideas are not new or original. It may better be described as a new formula for combining old ingredients. D. Howard Doane

What Kind of a Farm Program Should We Have?

Farmers, farm organizations, Congress, and many others will be seeking an answer to this question in the months ahead. The aim of any good farm program should be to serve America.


A NATIONAL FARM PROGRAM SHOULD BE FAIR TO ALL
Producer
Consumer

During the early days of the cotton control program, Mr. Doane, then in active charge of some large cotton plantations in Mississippi, was asked to assist in working out a more effective program. Since then he has continued to study, work upon, and advise in regard to various farm programs.

Mr. Doane's recent duties in Washington brought up once more the question -- 'What kind of a farm program should we have?'. The Digest presents here his thoughts on this question. We trust that the ideas which follow will be constructively helpful. Editor

WHAT KIND OF A FARM PROGRAM SHOULD WE HAVE?

In the creation of any Federal Program for agriculture it is essential to establish first the objectives sought.

The Federal Government, in our opinion:

1. Should not sanction a program of scarcity or destruction of crops or livestock.

2. Should not guarantee any specific level of prices or income.

3. Should not enter into the production, handling, storage, processing or financing of farm products as a primary undertaking, unless and until private enterprise is unwilling or unable to perform the essential services.

4. Should not set up any plan that makes necessary a large force of field employees to check, control, police and supervise farmers.

5. Should not impose production controls that do not control, such as acreage control.

The objectives of a government farm program should be to:

1. Prevent extreme fluctuations in agricultural production and prices. An unbalanced relationship between agricultural and urban activities threatens the entire nation.

2. Reduce the penalties of over-abundant production -- especially when this is the result of government requests for increased production or of forces beyond the control of the producer.

Consideration of the foregoing shows that these concepts are a matter of relationships, not the creation of fixed levels of prices or income. It does not guarantee prosperity for agriculture when urban economy is prostrate or visa versa.

THE PLAN

A government farm plan should have three major parts or divisions.

Prevention
Planning and execution
Financing

PREVENTION

The prevention section of the organization (consisting of a small staff at Washington) should devote itself to the prevention of that type or degree of unbalance in agricultural production that causes serious price declines. Broad price declines result from an excess of production, and (or) inability of custom-

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(Prevention continued)

ers to purchase. Thus price declines, both actual and relative, must find their cure on both sides of the bargaining table. Some of the steps to be taken or tools to be used are:

1. Keep producers posted on factors affecting their planting and harvests. Some up-trends in production give clear and accurate warning of what is ahead. Data supporting these trends should be forcefully presented with particular attention to producers in areas of greatest volume of production. Mere publication of statistics will not be adequate. Facts should be stated and interpreted. Consequences as they begin to appear must be shown.

2. Work out in detail and urge the adoption of alternate farm plans. These should be so set up that they could be easily adapted by individual farmers to fit their own needs.

3. Call meetings and conferences with representatives of consumers and producers. The purpose would be to plan means of getting production in balance with consumption through normal commercial channels.

4. Be ready with other tools short of restriction, subsidies, or penalties if the first three fail to keep the economy in balance. Many tools are available and often very effective. They can be applied at little or no cost.

Here are some illustrations and examples of tools that can be used.

TAX LAWS CAN BE CHANGED. Citrus fruits are now in excess production and prices are ruinously low because a tax ruling made it possible for growers to plant new groves out of current income. Growers found that they could get their new orchards for a cost that Uncle Sam shared to the tune of 25 to 75 per cent depending on the tax bracket. It took no prophet to see the result of this tax-plant program. In this case an alert Prevention Division could have easily prevented the situation by the simple expedient of a change in tax rulings which has now been made.

PREMIUMS OR PENALTIES on varying weights and classes of livestock can be imposed. Lard supplies can be cut sharply by putting top prices on 180 pound hogs and imposing penalties on heavy weight hogs.

LIVESTOCK NUMBERS can be increased. It takes, in round figures, seven to ten pounds of feedstuffs to make one pound of live animal. This fact presents a storage opportunity far beyond any practical physical storage of grain. To convert feed surplus into beef, pork, milk and eggs will give us food of higher quality and use up seven pounds to get one.

BUTTERFAT REQUIREMENTS of milk at retail can be adjusted. For example, it takes 28.6 per cent more milk (3.5 percent butterfat) to raise the butterfat content of retail milk by one point.

MINIMUM GRADE STANDARDS can be raised or lowered. The experience of tangerine growers is a good example. One year when the tangerine crop was excessive, growers, on their own behalf, set a minimum size for all fruit moving to market. If the flow became heavy the requirement was raised. The net effect was to regulate the flow to market, thus preventing gluts and price depression.

GOVERNMENT PROGRAM can be better co-ordinated. There are plenty of examples of various government programs working at cross purposes. For instance fertilizer, from new government owned plants, is sold at less than cost or given away and requests for crop curtailment go out at the same time. One agency calls for reduced acreage while another pushes reclamation projects to bring new acres into production.

EXPORT AND IMPORT CONTROLS can be correlated. We fight an excess of domestic products and import the same, similar or competing products from another country. Sometimes a product in one form is excluded while in another form it comes in freely.

LENDING AND INSURANCE POLICIES of the government can be adjusted as conditions change. In time of need, loans to bring in new land or crop insurance to encourage expanded operations in the marginal or high-risk farming areas are necessary. They may be out of place entirely when surpluses begin to accumulate.

ALTERNATE CROPS AND LIVESTOCK can be encouraged. At the present time sheep numbers are very low compared to beef cattle and to prewar. Producers who are favorably situated should be encouraged to increase sheep numbers.

These are but a few of the tools, that could be used by an organization whose function was to prevent excess

(Continued on Page 33)

A NATIONAL FARM PROGRAM

(Continued)

production. All are relatively inexpensive and not too difficult to administer. Many depend upon industry and government working together. Certainly they would require the various agencies and departments of government to work together.

PLANNING AND EXECUTION

If prevention works perfectly, other more extensive and expensive programs would not be needed. However, prevention will not always meet the situation, so plans that involve more positive action will sometimes become necessary.

The purpose should be to devise a program that will result in more production when more is wanted and less production when less is wanted. The tools that may be used are:

1. A flexible support or the use of only a portion of parity as a guarantee.
2. Production control.
3. Marketing quotas and other measures.

THE SELECTION OF THE TOOL is most important. It should --

Be easily understood.

Require a minimum of enforcement personnel.

Hold regimentation to a minimum.

Require a minimum physical handling of any crop or product.

Hold costs to lowest possible limit.

Fixed Price Support programs will not do the job of controlling production. This is because costs of production vary from producer to producer, from area to area, and from year to year. A price support that puts one producer out of business will stimulate another.

Flexible Price Support programs most nearly meet the requirements. In essence, the administrator continues to reduce the support level until production is cut and the market takes the smaller amount at the lower price.

Excess Production in any one year could be handled in one or both of two ways:

1. Let the market absorb the product at the market price and the government pay any difference between market price and the support price;
2. Let the government buy on the market enough of the excess to bring demand and supply into balance, at the support price.

When the government buys, it will be necessary to remove the government holdings from the visible supply so that they will not hang over the market and depress prices.

NON-PERISHABLE PRODUCTS -- One of the surest and quickest ways to dispose of grains would be to convert all convertible crops into alcohol or other "chemurgic" products. Alcohol has many uses in industry. If necessary, it could be used as a liquid fuel and used to protect our dwindling oil reserves. Our greatest grain surpluses could have been entirely consumed through alcohol, if only 10 per cent of our gasoline had been replaced with alcohol.

PERISHABLE PRODUCTS - Government purchase of fresh fruits and vegetables and meat animals seems impractical. There are a few non-edible uses for low grade animals such as fertilizer and tankage, but any major surplus should not be so converted.

Perishable products should be allowed to go to market and sell at whatever they would bring. The government would make up the difference between the price received and the support price. This plan keeps the government out of the market; avoids physical handling such as storage, transportation, manufacturing and selling; and it does not impose a double cost on the consumer.

Each Product or logically associated group of products should be administered by a "Federal Commodity Office" responsible for all phases of the program. Each commodity office should select the tools best fitted to handle the products for which it is responsible.

FINANCING

A central financing agency will be necessary to serve as the "banker" for the various commodity offices. This could be newly created or made a part of some agency now available. The "bank" would not operate the program but it would be responsible for the money.

Congress would set up a revolving fund and make this available to the bank. Overall limitation would be placed on expenditures, and depending on conditions, limits might or might not be placed upon specific programs.

(Continued on Back)

DOANE AGRICULTURAL DIGEST FEB., 1949

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A NATIONAL FARM PROGRAM

Funds would be withdrawn by the commodity office as needed and the bank would report annually to Congress. It would then be up to Congress, to appropriate funds to bring the bank's resources back up to the original level. The amount appropriated each year would become the cost of carrying out the program.

THE PLAN IN SUMMARY

Set up a federal office whose function would be to keep the production and consumption of agricultural products in balance. This office would not handle products or make payments to producers. It would operate within commercial channels and use "tools" that are constantly available.

Set up an administrative office broken down by commodities whose function it would be to actually handle products and make payments to producers when necessary. The function of the commodity office would be to increase production when more was wanted and reduce production when less was wanted. Price supports, when needed, would be determined in advance and would be announced before planting time.

Set up a bank, whose funds would be available to the commodity offices in carrying out this program. It would not be charged with the responsibility of administering any program.

This is a Program of Abundance-Farmers are left free to grow the amount and kinds of products that are best suited to their farms. Interference with normal marketing activities would be held to a minimum. Natural laws and established agencies would be given freedom of operation before government influences were interjected. No police powers are required; no plow-up or acreage controls would be used.

Inducements and restraints could and would be applied by commodities without interference with other commodities that were not in excess. It is simple, direct, easily understood, and when fully functioning should result in minimum costs.

LIMITATIONS OF PARITY-PRICE APPROACH

(The following is a quotation selected from a committee report of The American Economic Association. Underlining by Editor).

PARITY PRICES, as now computed, are particularly deficient in two respects: they prevent the adjustment of current consumption of the various agricultural products to existing supplies; and they hinder the maintenance of a good production balance within agriculture. These deficiencies are inherent in the formula itself. The price relationships that prevailed in the base period are perpetuated in the current parity prices. No account is taken of the changes in the relative costs of producing the different agricultural commodities or of the changes in the relative demands for them which have occurred since the base period. For many commodities the base period is still 1910-1914, a third of a century ago.

Experience suggests that maintenance of market price of agricultural products at or near their respective parity levels as now computed would sooner or later lead to the following adverse results:

1. Needed adjustments in agricultural production will be impeded; shifts in acreage of crops and number of livestock in accordance with changes in basic cost and demand conditions will be retarded; and production will tend to be maintained in high-cost areas and expansion of production curtailed in low-cost areas.

2. Commercial outlets, both domestic and foreign, will be restricted.

3. Excessive stocks of nonperishable commodities will be accumulated, and perishable commodities will be wasted.

4. Acreage allotments and marketing quotas will be re-established.

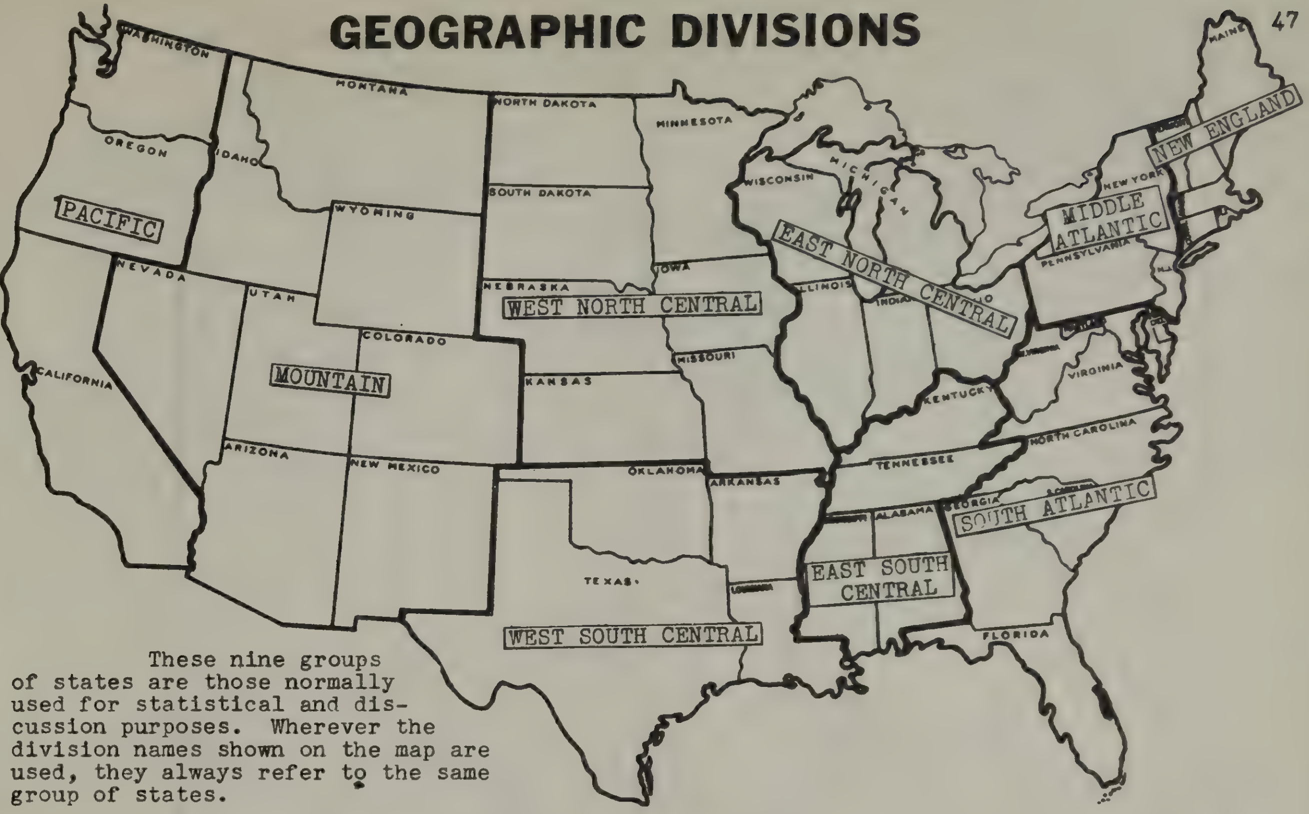
5. Substantial government subsidies to agriculture will be required during periods of national prosperity.

These adverse consequences would be lessened only as market prices were permitted to depart from parity.

Income Supports In Depression

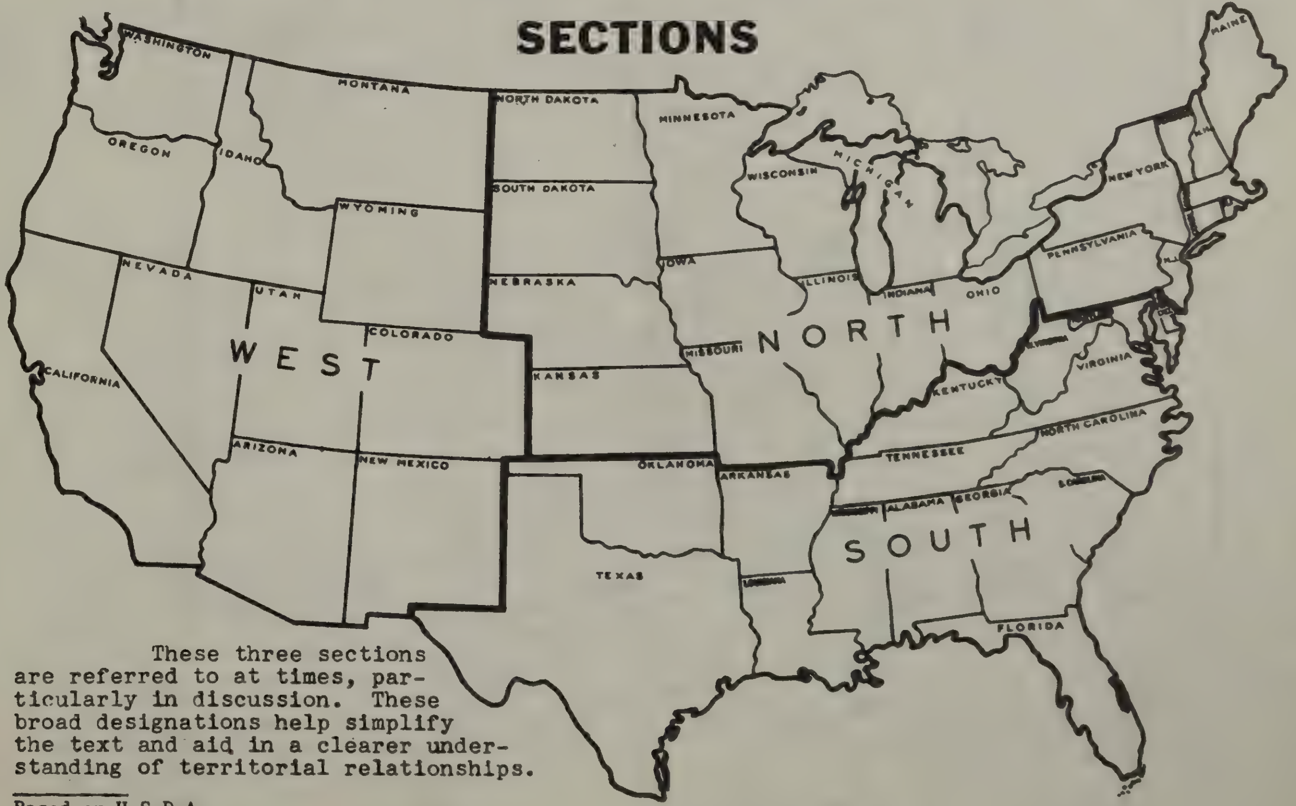
Agricultural economists generally agree that income supports should be provided for agriculture during severe and prolonged depressions. While opinions among them differ regarding the kind of income supports that should be instituted, few question the need for doing something. Moreover, there is general agreement that such income supports as are undertaken should be in the form of direct payments to producers rather than manipulation of market prices.

GEOGRAPHIC DIVISIONS



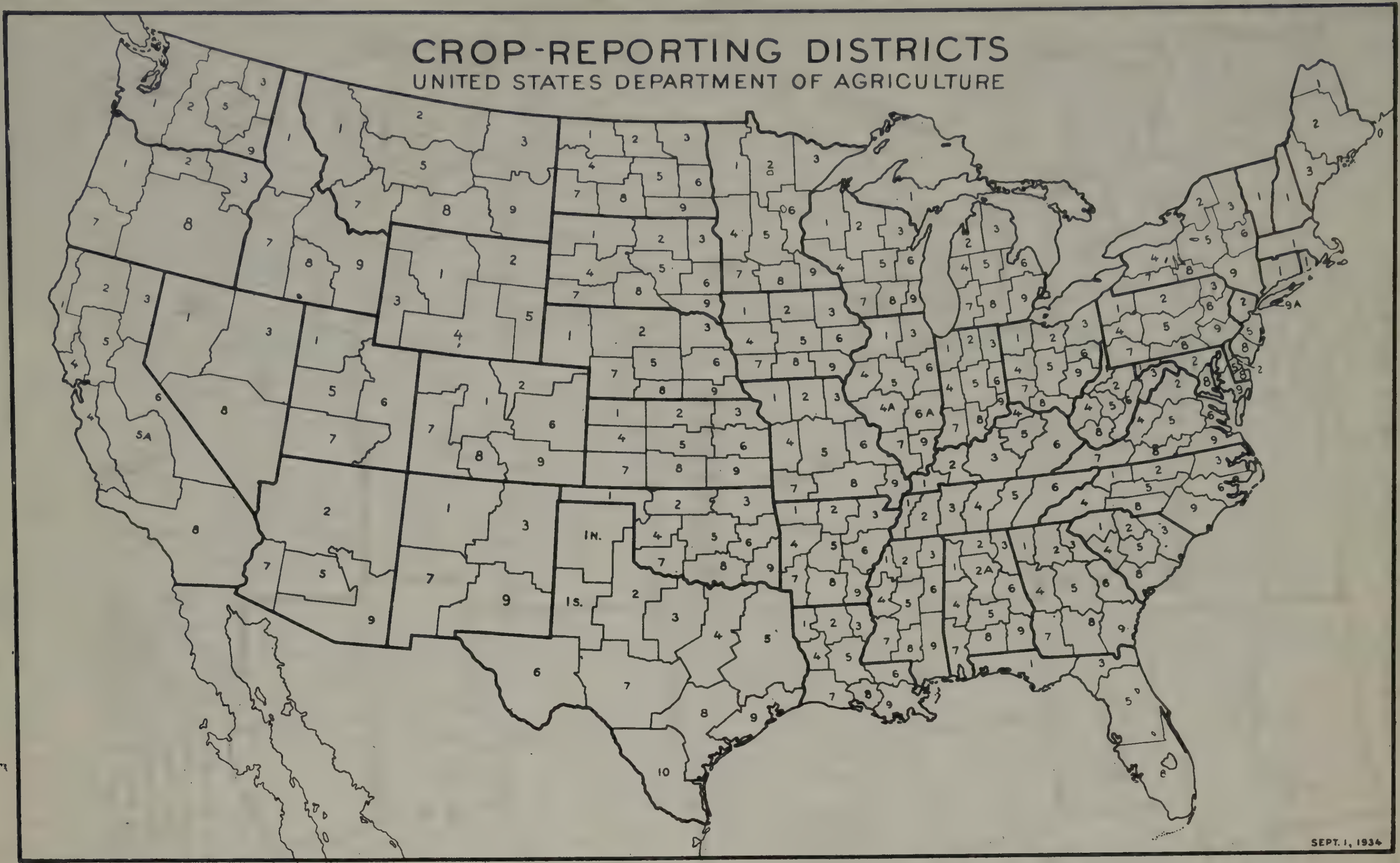
These nine groups of states are those normally used for statistical and discussion purposes. Wherever the division names shown on the map are used, they always refer to the same group of states.

SECTIONS



These three sections are referred to at times, particularly in discussion. These broad designations help simplify the text and aid in a clearer understanding of territorial relationships.

Based on U.S.D.A.



CROP-REPORTING DISTRICTS
UNITED STATES DEPARTMENT OF AGRICULTURE

SEPT. 1, 1934

U.S. DEPARTMENT OF AGRICULTURE

NEG. 24286-A

50 Farming and Business

DOANE AGRICULTURAL DIGEST
Facts and Opinions From the Oldest and Largest Farm Management & Research Service in the United States.

BUSINESS AND AGRICULTURE

MAY 15, 1953

Lower farm price trend requires that we examine the farm financial picture closely.

Agriculture's Financial Position is sound. On January 1, total farm assets were 12 times the total farm debt. Even if valued at 1940 prices, farm assets would be 5½ times the farm debt. This is the same ratio as in 1940.

The Federal Reserve Bank of Chicago points out that even with a lower level of prices, debts are not high if judged in relation to the value of farm assets.

The values of farm assets depends directly on farm product prices and net income from farming. Further declines in values are expected. The drop in land values is a good example. Lower net incomes also hinder the building up of assets.

Continued adjustments are in store. But the Chicago Federal Reserve Bank points out that the financial structure of agriculture would crumble only with a general business recession. This would sharply shrink consumer incomes and the domestic demand for farm products.

Young Farmers make larger net incomes than older farmers according to recent studies in New York and Vermont. Reasons are that younger men get more efficient use of labor and higher rates of production.

AGE OF OPERATOR AND FARM BUSINESS FACTORS

AGE OF OPERATOR	CWT. MILK PER COW	COWS PER MAN	LABOR INCOME
LESS THAN 36 (AVG. 30)	89	19	$ 5002
36 - 40	86	20	3977
41 - 50	86	18	3144
51 - 60	83	17	2569
61 OR MORE	81	17	408

FROM A STUDY BY A. J. ASHE, CORNELL UNIVERSITY

Lessons to learn from these studies: → The man who wants to farm for a lifetime should pay for his farm while he is young and his earning capacity is greatest.

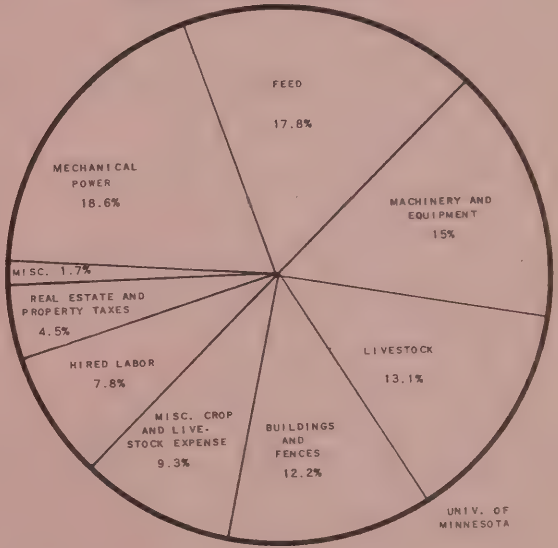
→ Where father and son are working together, both should recognize the advantage of gradually transferring the burden of management and ownership to the younger man at an early date.

Cash Expenses of Minnesota farmers averaged 74 cents out of every dollar of farm income in 1951. In 1928, expenses were only 51 cents. This shrinking margin could cause a serious threat to the farmer's financial standing in case of another serious price decline.

The University of Minnesota is telling farmers that more careful planning of capital outlay will be needed in the future. They also point out the need for more flexible credit. Since 1928, farmers have become much more dependent on items produced by industry.

FARMERS CASH OUTLAY

PRODUCTION EXPENSE BY PERCENT, 1951



UNIV. OF MINNESOTA

Storage Bins will be a good investment if bought or built with an eye for lowest cost that will meet government storage requirements. Howard H. Gordon, Production and Marketing Administrator for USDA, told Panhandle Grain and Feed Dealers, "Frankly, we are worried about grain storage this year. The situation may in general be almost as tough as it was in 1949".

The Department of Agriculture has leased 50 or more Liberty ships to store grain acquired under the support program. This will take pressure off wheat storage in the East, but problems in Midwest and West are serious.

Payment of 13 cents a bushel is being offered to farmers who hold 1952 corn on the farm until July 31, 1954. On 1952 oats, CCC will pay 10 cents a bushel for storage through April 30, 1954. No storage payment is made if the crop is sold before the above dates.

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Improved Purdue Supplement A was the highlight of Indiana Cattle Feeders Day. New formula increased daily gains almost a third of a pound compared to the old formula. Cost per pound of gain dropped from $.188 using old formula to $.162 with the improved supplement.

FORMULA FOR IMPROVED SUPPLEMENT A

Soybean Meal	650.5 lb.
Molasses	140.0 lb.
Alfalfa Meal	140.0 lb.
Bonemeal	52.0 lb.
Salt with Cobalt	17.0 lb.
Vit. A and D conc.	.5 lb.
Total	1000.0 lb.

Dehydrated alfalfa meal containing 17 percent crude protein was used. One ounce of cobalt sulfate was added per 100 pounds of salt.

A supplement designed for use with grass-legume silage was also announced. It contains less protein and more carbohydrates.

FORMULA FOR PURDUE SUPPLEMENT G

Alfalfa Meal	400 lb.
Molasses	329 lb.
Dried Brewer's grains	132 lb.
Bonemeal	105 lb.
Salt with cobalt	34 lb.
Total	1000 lb.

When fed at the rate of 1.25 pounds per day, average daily gain using Supplement G and grass silage was 1.69 pounds per day.

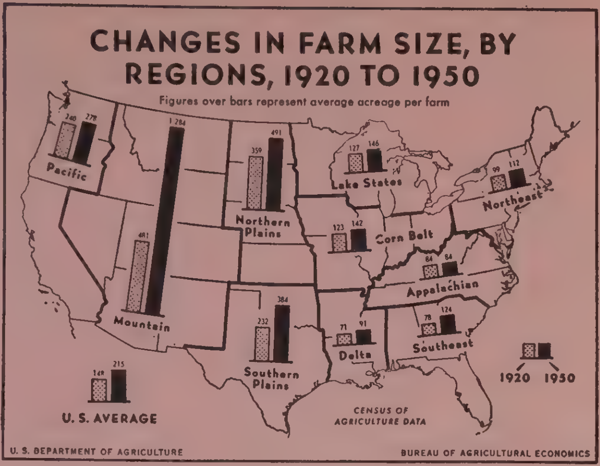
Animal Fat Surplus may be licked by chemists. Meat processors and rendering plants pile up 5 billion pounds of animal fats every year. Low prices for these fats and other animal by-products have been one of the principal reasons for reduced livestock prices. Vegetable shortenings and detergents have taken over much of the market held by animal fats in the past.

A method of making epoxidized oil from animal fats has been perfected at the USDA Eastern Regional Laboratory. Oil is used as a plasticizer to make plastics pliable. Plasticizers make up from 30 to 40 percent of a plastic and production of plastics is now at the rate of 500 million pounds a year.

Other new uses for animal fats have been in pet and poultry feeds, and in tin can plating. Animal fats can replace palm oil for the bath in hot-dip tinning of cans.

Detergents are also being made with animal fats. The cost is still too high but fats may get back into the dishpan some day.

Farm Size Has Increased in most areas during the past 20 years. Only the Appalachian region has shown no increase during this period. This increase has been brought about by farm mechanization and the decline in number of persons on farms. Increase in part-time farming near the larger industrial areas obscures part of this trend toward larger sized farms.


CHANGES IN FARM SIZE, BY REGIONS, 1920 TO 1950
Figures over bars represent average acreage per farm
Pacific
240
278
Mountain
481
1,284
Northern Plains
359
491
Lake States
127
146
Corn Belt
123
142
Northeast
99
112
Appalachian
84
84
Southern Plains
232
384
Delta
71
91
Southeast
78
124
U. S. AVERAGE
149
215
1920
1950
CENSUS OF AGRICULTURE DATA
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fused Tri-Calcium Phospate looks promising to Illinois researchers. This new fertilizer, also called fused rock phosphate, has been under development for several years by TVA. Raw rock phosphate is heated to a high temperature in the presence of silica and water vapor.

This treatment drives off most of the fluorine, which limits the amount of phosphorus that can become available each year. With most of the fluorine removed, a greater part of the phosphorus is as readily available as it is in superphosphate.

Fused tri-calcium phosphate contains 28 percent phosphoric acid. Of this, 16 percent is readily available and the remaining 12 percent is more available than phosphorus in rock phosphate. Cost per ton is about the same as for 20 percent superphosphate.

Change-Over Of Tire Industry to rayon cord will be virtually completed by 1954. Means an annual loss of a market for 700 to 950 thousand bales of cotton. At 1952 yields it took over 1.5 million acres of cotton to produce that much.

Combine Ownership is expensive for small acreages. But there are advantages during rainy periods in being able to cut when grain is ready. Balance these advantages against the costs when deciding whether to buy or hire a custom operator.

COSTS OF COMBINING GRAIN*
Southern Minnesota - 1951

Acres Combined	Cost Per Acre			Custom Rate
	Combine	Man - Tractor	Total	
48	$3.82	$1.21	$5.03	$4.00
98	2.68	1.21	3.89	4.00
194	2.50	1.05	3.55	4.00

*Does Not Include Hauling Data: Univ. of Minnesota

Farm Land Prices declined 2 percent from November 1952 to March 1953. Largest declines occurred in the Western States. Lower beef prices and poor yields were principal factors in decline. Complete details will be carried on new page 313, out June 1.

TRENDS IN FARM INCOME

Farmers' realized net income in 1952 (own wages plus return on investment) stayed just about the same as in 1951. This was 17 percent above 1950--the lowest year since World War II.

After paying production expenses, farmers had 14.3 billion dollars realized net income left, about 2.5 billion less than in the peak year of 1947. In terms of buying power, this net income was 2 percent below 1951 and 29 percent below 1947.

Farmers' cost of living rose about one percent during 1952, and production expenses went up more than 2 percent. This more than offset the rise in gross farm income.

The total net income of farmers (including inventory changes) represents the net value of the total farm operation. This fell about a billion dollars or 6 percent from 1951 to 1952, while total national income rose 6 percent.

Production costs have risen 33 percent since 1947. During this same period gross farm income took a big drop until 1951 when it rose to 9 percent above the 1947 level. It rose 1.5 percent more during 1952.

A LOOK AHEAD

With farm product prices averaging lower this year, cash receipts from farm marketings and gross farm income will be down from 1952. Total farm production expenses may decline slightly, but not enough to prevent a drop in farmers' realized net income. Net income is expected to be down about 7 percent from 1952 and farmers' buying power will be less.

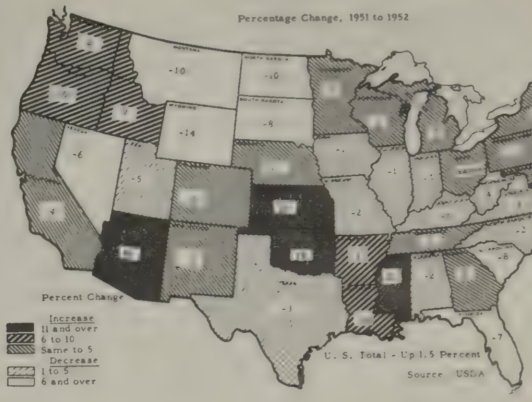
Total farm production this year will be about as large as 1952, if growing conditions are favorable. A small increase is in prospect for livestock products, but a smaller total crop production is expected.

The outlook now is less favorable than at the beginning of the year. Cattle prices have continued their sharp drop and heavy carry-overs are estimated for cotton, wheat and corn. All add up to a lower price level for farm products for the rest of the year. Since January, prices received by farmers have dropped 3 percent -- prices paid are down only one percent.

1952 CASH RECEIPTS

Cash receipts from farm marketings in 1952 were 33.1 billion dollars, 2 percent more than in 1951. The total volume of sales was 6 percent larger than last year, but average prices received were down 4 percent.

CASH RECEIPTS FROM FARM MARKETINGS


Percentage Change, 1951 to 1952

U. S. Total - Up 1.5 Percent

Source USDA

BY COMMODITIES -- Increases

- DAIRY -- receipts were up 5 percent because of a rise in average prices.
- BROILERS And TURKEYS -- up slightly.

- CROPS -- Most of the major crops had higher cash receipts in 1952 than in 1951. Potato receipts jumped most sharply, up 69 percent. This was due to a substantial price rise, since potato marketings declined.

Marketings of wheat, corn, cotton, hay, rice, oats and strawberries were all higher in 1952 compared to the previous year, and cash receipts were up in each case. Prices also were higher for hay, rice and strawberries.

Higher prices accounted for the larger cash receipts for sweet potatoes, dry edible beans, lemons, truck crops, apples and flaxseed.

-- Decreases

- LIVESTOCK AND POULTRY -- Cash receipts from cattle and calves were 7 percent below 1951 because of substantial price declines.

A 10 percent price drop, plus a slightly smaller quantity marketed, resulted in a 12 percent decrease in cash receipts from hogs.

A slight gain in the volume of eggs marketed was more than offset by a rather sharp drop in prices -- cash receipts from eggs dropped 10 percent.

Receipts from chickens other than broilers, and from sheep and lambs were also down.

- CROPS -- Marketings of grain sorghum, peanuts and barley were smaller than in 1951 and their cash receipts declined.

Lower receipts from soybeans, grapefruit, oranges and pears were due to lower prices. Declines in receipts from tobacco and grapes reflected both smaller marketings and lower prices.

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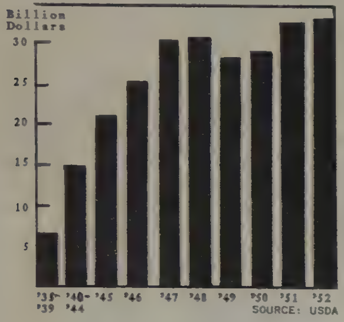
TRENDS IN FARM INCOME

CASH RECEIPTS FROM FARM MARKETINGS
1935-1939, 1940-1944 Averages; 1945-1952 Annual



SOURCE: USDA

BY STATES --

Total cash receipts from farm marketings in 1952 were above last year, but receipts in only 23 states were above the previous year. Cash receipts were lower in 25 states. Receipts from crops in most states were well above 1951. On the other hand, receipts from livestock and products were down in all but 3 states.

The largest percentage decline in total cash receipts was 14 percent in Wyoming. Prices of wool declined drastically last year and wool receipts in Wyoming dropped to about half their 1951 level. Receipts from sheep and lambs, cattle and calves and hogs also dropped. Total cash receipts were up 33 percent in Kansas, due mainly to larger marketings of wheat.

Increases in cash receipts were generally greatest in those states having a large proportion of their total receipts from crops. Arizona and Mississippi marketed more cotton. Louisiana had larger marketings and higher prices for rice. Oregon farm receipts were up because of increased sales and higher prices of wheat and potatoes.

Lower total receipts were due mainly to the break in livestock prices, but the drop in South Carolina was caused by a decline in cotton receipts. Lower receipts from broilers in Delaware and from oranges in Florida were mainly responsible for their decline of cash income.

FARM INCOME AND BUSINESS

Farm income is the major source of wealth for the rural communities. In these areas, most business is concerned directly with agricultural products. All businessmen should follow closely the outlook for the main sources of farm income in their territory.

CASH FARM INCOME BY STATES FOR 1950 TO 1952; BY PRINCIPAL SOURCES, 1951 AND 1952

State and Geographic Division	Cash Farm Income Including Government Payments			Income from Livestock		Income from Crops		Government Payments	
	1950	1951	1952	1951	1952	1951	1952	1951	1952
	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000
Maine	165,847	181,127	218,420	107,269	104,377	72,810	113,023	1,048	1,020
New Hampshire	64,702	68,993	67,251	59,044	57,083	9,433	9,668	516	500
Vermont	110,770	119,968	118,128	100,461	100,105	18,342	17,074	1,165	949
Massachusetts	174,516	211,532	203,315	152,928	142,989	57,953	59,776	651	550
Rhode Island	21,751	26,347	26,545	19,745	18,553	6,516	7,912	86	80
Connecticut	143,887	171,184	169,011	119,255	115,395	51,427	53,037	502	579
New York	816,601	904,043	934,946	658,102	652,429	238,806	277,529	7,135	4,988
New Jersey	291,141	360,024	359,017	240,029	229,569	119,069	128,560	926	888
Pennsylvania	738,716	842,691	854,409	643,580	644,679	192,685	203,192	6,426	6,538
NORTH ATLANTIC	2,527,931	2,885,909	2,951,042	2,100,413	2,065,179	767,041	869,771	18,455	16,092
Ohio	910,723	1,077,265	1,079,621	756,669	737,662	313,202	334,847	7,394	7,112
Indiana	981,821	1,148,548	1,102,678	830,216	779,060	311,457	316,750	6,875	6,868
Illinois	1,748,208	2,038,550	2,009,898	1,264,525	1,196,076	763,401	803,285	10,624	10,537
Michigan	667,002	734,091	752,881	476,861	469,114	248,411	274,820	8,819	8,947
Wisconsin	976,608	1,135,488	1,150,703	1,009,666	1,007,714	117,851	134,929	7,971	8,060
EAST N. CENTRAL	5,284,362	6,133,942	6,095,781	4,337,937	4,189,626	1,754,322	1,864,631	41,683	41,524
Minnesota	1,222,349	1,294,819	1,309,338	985,709	937,467	301,325	363,189	7,785	8,682
Iowa	2,125,789	2,372,705	2,341,853	2,070,725	1,913,495	290,270	415,350	11,710	13,008
Missouri	1,044,926	1,171,238	1,148,586	895,915	826,243	264,457	306,347	10,866	15,996
North Dakota	529,377	590,397	530,098	188,110	174,616	395,725	348,600	6,562	6,882
South Dakota	513,626	607,080	556,711	405,205	375,332	195,402	178,398	6,473	2,981
Nebraska	988,597	1,162,962	1,169,866	844,651	776,516	309,171	383,341	9,140	10,009
Kansas	1,037,638	1,055,408	1,403,260	691,333	650,344	356,083	741,564	7,992	11,352
WEST N. CENTRAL	7,462,302	8,254,609	8,459,712	6,081,648	5,654,013	2,112,433	2,736,789	60,528	68,910
Delaware	99,507	112,958	104,613	89,078	78,945	23,409	25,250	471	418
Maryland	238,520	271,332	270,777	184,474	177,223	85,185	91,955	1,673	1,599
Virginia	441,295	511,165	506,523	277,438	264,497	228,354	237,063	5,373	4,963
West Virginia	117,903	142,175	136,108	115,074	107,921	24,946	26,343	2,155	1,844
North Carolina	804,303	955,328	936,738	195,458	203,557	751,838	726,391	8,032	6,790
South Carolina	291,149	416,789	383,856	84,425	81,430	328,673	298,929	3,691	3,497
Georgia	529,991	627,477	659,665	238,934	249,910	379,909	402,166	8,634	7,589
Florida	501,584	510,779	473,568	120,271	115,492	386,940	354,439	3,568	3,637
SOUTH ATLANTIC	3,014,734	3,548,003	3,471,848	1,305,152	1,278,975	2,209,254	2,162,536	33,597	30,337
Kentucky	525,163	619,986	591,008	331,551	315,072	281,069	268,202	7,366	7,734
Tennessee	437,039	522,889	530,041	278,887	258,596	236,996	264,679	7,006	6,766
Alabama	357,892	450,533	444,256	179,157	168,622	265,028	267,348	6,348	8,286
Mississippi	489,663	558,069	615,387	164,657	160,857	385,237	448,791	8,175	5,739
Arkansas	517,790	575,801	626,265	206,441	200,651	362,827	419,192	6,533	6,422
Louisiana	331,430	393,032	429,912	118,400	111,580	263,048	308,789	11,584	9,543
Oklahoma	573,406	631,674	713,160	402,493	371,156	219,943	333,155	9,238	8,849
Texas	2,171,996	2,208,791	2,141,207	1,119,158	970,365	1,067,451	1,150,808	22,182	20,034
SOUTH CENTRAL	5,404,419	5,960,775	6,091,236	2,800,744	2,556,899	3,081,599	3,460,964	78,432	73,373
Montana	382,336	441,260	397,532	234,597	199,957	200,624	191,898	6,039	5,677
Idaho	345,434	357,619	380,926	174,260	162,248	177,557	214,094	5,802	4,584
Wyoming	146,285	195,002	166,656	162,283	127,797	29,063	36,069	3,656	2,790
Colorado	517,766	561,218	587,267	382,487	350,521	170,072	229,006	8,659	7,740
New Mexico	209,283	238,766	244,289	165,268	140,321	70,637	102,238	2,861	1,730
Arizona	277,637	359,138	417,199	136,099	118,491	221,554	297,282	1,485	1,426
Utah	158,376	191,165	180,512	142,533	130,759	45,468	47,710	3,164	2,043
Nevada	48,401	63,109	59,460	56,563	51,289	6,281	7,903	265	268
Washington	539,675	557,618	601,196	207,172	205,359	346,349	392,001	4,097	3,836
Oregon	392,756	434,437	476,749	207,872	200,807	223,213	272,948	3,352	2,994
California	2,335,082	2,724,743	2,818,524	1,073,933	1,066,353	1,637,320	1,740,965	13,490	11,206
WESTERN	5,353,031	6,124,075	6,330,310	2,943,067	2,753,902	3,128,138	3,532,114	52,870	44,294
U.S. TOTAL	29,056,297	32,907,313	33,399,929	19,568,961	18,498,594	13,052,787	14,626,805	285,565	274,530

Source: USDA

FARMERS' INCOME -- GOING DOWN!

For the first time in over ten years, the squeeze on the farmer's pocketbook is noticeable all over the country. In 1948, the farmer's net income started to slide downhill, and now the cash receipts from farm marketings have also tumbled from their high peak.

Cash receipts declined from 1948 to 1949 in all but 5 states, with an average drop of 10 per cent for the United States as a whole. The total receipts came to 27.5 billion dollars. Prices of farm products were down 13 per cent on the average, and this drop was only partly offset by a small increase in the total sales volume. Price declines averaged a little smaller for crops than for livestock, -- a 5 per cent rise in marketings was an important offsetting factor in the case of crops.

CASH RECEIPTS BY COMMODITIES

Increases

- BROILERS were the only livestock commodity to show an increase in cash receipts in 1949. Sales of broilers were up about 30 per cent. This more than offset the lower prices.

- CITRUS -- Total receipts from all citrus fruits -- up 15 per cent from 1948. Grapefruit receipts up 100 per cent. Lemons showed substantial rise -- oranges stayed about the same.

- CORN -- up one-fifth from 1948. Larger sales more than offset a drop in prices.

- COTTON LINT -- up 5 to 10 per cent.

- SUGAR BEETS and SUGAR CANE -- Receipts from sugar beets were up 10 per cent, and from sugar cane, about 15 per cent.

Decreases

Cash receipts for most farm commodities were lower in 1949 than in 1948.

- POULTRY, other than broilers: Chickens -- down almost 10 per cent; eggs -- down about 3 per cent. Total receipts from ALL poultry and eggs showed little change from last year.

- LIVESTOCK -- Cash receipts for sheep and lambs were down more than 20 per cent -- the largest percentage drop for any livestock item.

Hogs, cattle and calves -- were each down 10 to 15 per cent from 1948.

Dairy receipts were off about 15 per cent: milk production was up slightly, but prices averaged substantially lower.

- CROPS -- Rye and flaxseed receipts dropped around 50 per cent -- the largest declines for any crops.

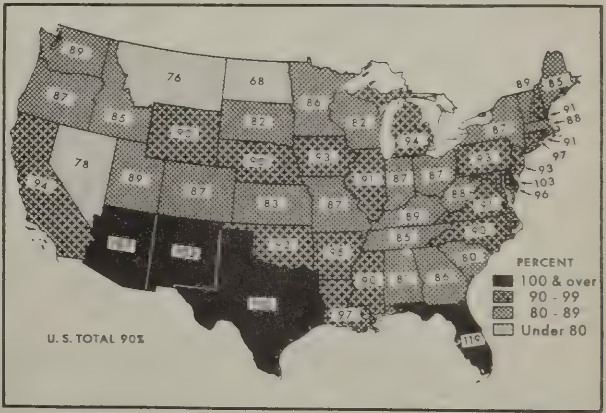
Cottonseed -- down 20 per cent. Combined lint and seed receipts -- very slightly above 1948 level.

Wheat -- volume and prices both lower in 1949; cash receipts down nearly 15 per cent.

Tobacco -- 5 to 10 per cent lower; all types shared in decline.

Receipts for the following 1949 crops were also lower than in 1948: potatoes, soybeans, peanuts, oats, hay, barley, rice, dry edible beans, truck crops and most of the noncitrus fruits.

CASH RECEIPTS from FARM MARKETINGS
1949 as Percentage of 1948



U. S. DEPARTMENT OF AGRICULTURE — BUREAU OF AGRICULTURAL ECONOMICS

CASH RECEIPTS BY STATES

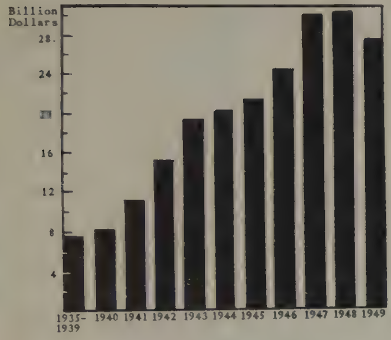
Declines were rather evenly distributed throughout the country; in most states they occurred in both crops and livestock. For the most part they reflected the influence of lower prices, -- the volume of marketings was usually equal to or larger than the 1948 volume. Declines of about 10 to 15 per cent were the rule; they occurred in more than half the states.

The largest decreases were: North Dakota -- 32 per cent, because of smaller marketings and lower prices for wheat and flaxseed; Montana -- 24 per cent, with less wheat, barley

(Continued on Back)

CASH FARM INCOME

CASH RECEIPTS FROM FARM MARKETINGS
1935-1939 Average - 1940-1949 Annual



and cattle sold at lower prices; Nevada -- 22 per cent, because of a sharp decline in the markting of cattle and calves.

Florida cash receipts rose 19 per cent because of higher citrus prices; Texas -- up 10 per cent because of increased sales of cotton and wheat -- also because of higher citrus prices; Arizona -- up 7 per cent, due mostly to larger cotton sales.

NET INCOME TUMBLES

Farm operators in the United States realized about 17 per cent less net income from farming in 1949 than they did in 1948 -- 13.8 billion dollars as compared to 16.7 billion a year earlier. Net income has fallen 22 per cent from the 1947 peak. Because of the general business rise this spring, net income in 1950 may hold close to 1949 levels.

BUT! prices paid by farmers for family living and maintenance were higher in 1949 than they were in 1947; and the two year drop in farmers' net income was even greater when measured in terms of what that income would buy -- down almost 25 per cent. There is little chance that the prices paid will drop much this year.

FARM INCOME AND BUSINESS

In rural areas, farm income is the major source of new wealth for the community. In practically all of the towns and small cities in these areas, most business is concerned directly with agricultural products. Even in a large city such as St. Louis, over half of the industry deals with the handling and processing of agricultural products. All businessmen should follow closely the outlook for the main sources of farm income in their territory.

CASH FARM INCOME BY STATES FOR 1938 AND 1947-49; BY PRINCIPAL SOURCES, 1948 AND 1949

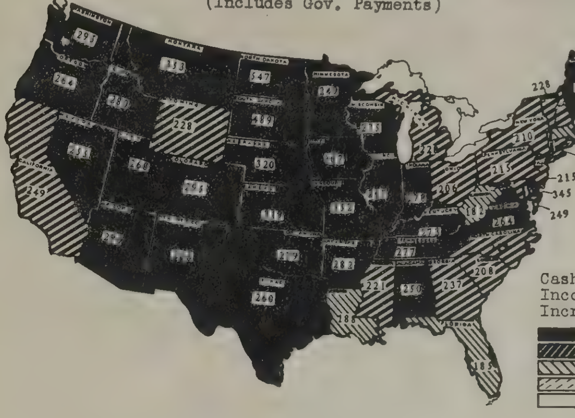
State and Geographic Division	Cash Farm Income Including Government Payments				Income from Livestock		Income from Crops		Government Payments	
	1938	1947	1948	1949	1948	1949	1948	1949	1948	1949
	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000
Maine	49,496	179,088	213,201	180,114	70,800	64,868	141,195	114,502	1,206	744
New Hampshire	22,570	65,099	69,729	63,283	52,992	47,895	16,242	14,989	495	399
Vermont	38,025	116,636	130,895	116,358	104,333	93,512	25,027	21,734	1,535	1,112
Massachusetts	73,934	189,538	207,418	181,656	127,846	120,309	78,593	60,877	979	470
Rhode Island	9,357	22,072	24,497	22,377	17,399	16,087	7,006	6,225	92	65
Connecticut	54,276	151,133	184,104	142,034	101,587	99,261	81,986	42,380	531	393
New York	298,798	884,776	971,581	846,036	654,010	579,482	312,412	262,079	5,159	4,475
New Jersey	100,196	295,026	317,843	293,874	184,360	179,235	132,490	114,010	993	629
Pennsylvania	258,301	782,391	829,329	767,242	619,725	563,644	204,286	198,770	5,318	4,828
NORTH ATLANTIC	904,953	2,685,809	2,948,597	2,612,974	1,933,052	1,764,293	999,237	835,566	16,308	13,115
Ohio	317,668	1,004,878	1,057,535	916,502	740,363	619,724	309,062	292,221	8,110	4,557
Indiana	273,152	1,070,424	1,064,492	919,891	755,254	639,248	303,204	276,774	6,034	3,869
Illinois	497,248	1,883,973	1,887,482	1,708,847	1,137,073	948,411	740,007	754,532	10,402	5,904
Michigan	215,744	718,564	726,025	681,187	449,252	411,886	268,313	265,106	8,460	4,195
Wisconsin	293,383	1,065,775	1,158,799	944,247	1,002,467	822,304	148,057	117,683	8,275	4,260
EAST N. CENTRAL	1,597,225	5,743,614	5,894,333	5,170,674	4,084,409	3,441,573	1,768,643	1,706,316	41,281	22,785
Minnesota	343,050	1,333,345	1,342,192	1,150,836	913,718	808,849	418,595	336,206	9,879	5,781
Iowa	591,712	2,400,315	2,147,430	1,999,172	1,760,706	1,548,527	375,976	445,344	10,748	5,301
Missouri	254,051	1,093,345	1,092,115	949,850	814,465	704,780	271,252	239,577	6,398	5,493
North Dakota	102,175	701,728	689,708	468,250	195,788	169,020	486,936	295,683	6,984	3,547
South Dakota	106,849	679,669	645,995	531,630	385,214	327,391	256,362	199,998	4,419	4,241
Nebraska	215,892	1,086,140	1,034,252	925,301	676,166	591,869	349,581	326,591	8,505	6,841
Kansas	247,715	1,224,686	1,137,684	939,655	542,596	484,758	587,723	448,818	7,365	6,079
WEST N. CENTRAL	1,861,444	8,519,228	8,089,376	6,964,694	5,288,653	4,635,194	2,746,425	2,292,217	54,298	37,283
Delaware	25,108	88,090	99,171	102,265	80,714	86,179	17,940	15,840	517	246
Maryland	68,451	239,827	250,882	241,825	168,601	159,834	80,621	80,303	1,660	1,688
Virginia	125,299	418,782	451,902	409,388	231,788	210,278	216,074	195,593	4,040	3,517
West Virginia	41,109	121,568	131,538	115,745	102,019	89,255	27,573	24,572	1,946	1,918
North Carolina	232,713	767,516	799,868	720,270	153,535	142,292	638,428	570,421	7,905	7,557
South Carolina	100,022	329,621	352,722	280,677	77,213	72,061	272,249	205,982	3,260	2,634
Georgia	158,469	521,974	525,915	454,478	169,800	166,179	349,720	282,396	6,395	5,903
Florida	117,049	325,867	338,743	400,733	104,824	94,616	230,491	303,937	3,428	2,180
SOUTH ATLANTIC	868,220	2,813,245	2,950,741	2,725,381	1,088,494	1,020,694	1,833,096	1,679,044	29,151	25,643
Kentucky	167,233	610,000	600,160	532,944	324,909	274,081	266,643	253,839	8,608	5,024
Tennessee	140,987	484,383	508,468	432,074	242,806	214,321	260,049	212,593	5,613	5,160
Alabama	123,742	398,332	430,403	351,161	130,210	123,794	296,043	221,885	4,150	5,482
Mississippi	173,166	497,073	538,225	486,078	132,974	112,960	399,567	368,352	5,684	4,766
Arkansas	157,133	515,623	562,447	531,650	168,039	155,143	389,364	372,464	5,044	4,043
Louisiana	124,817	344,476	359,918	351,244	107,575	96,129	243,785	246,022	8,558	9,093
Oklahoma	185,611	647,598	679,005	628,417	345,384	304,113	327,945	317,650	5,676	6,654
Texas	530,398	1,956,993	1,971,093	2,165,533	882,947	807,144	1,071,708	1,343,650	16,438	14,739
SOUTH CENTRAL	1,603,087	5,454,478	5,649,719	5,479,101	2,334,844	2,087,685	3,255,104	3,336,455	59,771	54,961
Montana	76,715	376,829	399,503	301,206	180,275	151,783	212,690	146,044	6,538	3,379
Idaho	86,612	373,456	378,895	323,058	162,013	128,931	209,941	189,068	6,941	5,059
Wyoming	45,296	152,772	166,404	149,617	126,834	105,702	36,464	41,858	3,106	2,057
Colorado	122,457	513,657	558,117	481,304	301,039	257,996	247,622	219,836	9,456	3,472
New Mexico	51,559	172,232	191,343	194,017	119,318	104,938	69,473	88,015	2,552	1,064
Arizona	57,108	136,749	222,475	237,049	80,443	71,395	140,240	164,909	1,792	745
Utah	46,262	158,380	160,998	142,113	112,670	97,331	45,251	42,901	3,077	1,881
Nevada	12,261	42,115	52,862	40,948	44,446	32,877	7,987	7,942	429	129
Washington	137,527	594,897	570,179	508,077	200,924	181,506	365,257	324,361	3,998	2,210
Oregon	105,678	389,094	390,758	336,870	172,728	151,954	213,834	182,466	4,196	2,450
California	591,713	2,151,196	2,177,699	2,036,035	830,636	717,588	1,333,452	1,309,227	13,611	9,220
WESTERN	1,333,278	5,111,377	5,269,233	4,750,294	2,331,326	2,002,001	2,882,211	2,716,627	55,696	31,666
U. S. TOTAL	8,168,207	30,327,751	30,801,999	27,703,118	17,060,778	14,951,440	13,484,716	12,566,225	256,505	185,453

USDA DATA

FARM INCOME REACHES PEAK

CASH FARM INCOME

Percentage increase in farm income 1948 over 1935-39 average
(Includes Gov. Payments)

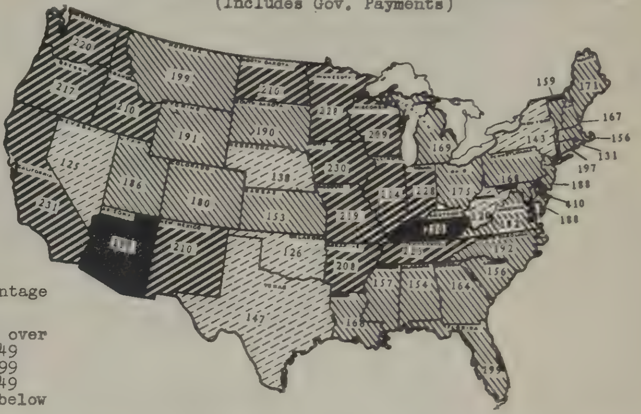


Cash Farm
Income Percentage
Increase

■ 250 and over
▨ 200 - 249
▧ 150 - 199
▤ 100 - 149
☐ 99 or below

CASH FARM INCOME

Percentage increase in farm income 1948 over 1924-29 average
(Includes Gov. Payments)



FARM INCOME TRENDS

Cash farm income for the country as a whole in 1948 was 189 per cent above the 1924-29 (pre-depression) average and 269 per cent above the 1935-39 (pre-war) average. (Note the maps above).

Cash farm income during 1948 was 2.5 per cent higher than in 1947, even though most crops sold below 1947 levels. But, there was a drop of more than 2 per cent in net farm income, the first drop in 10 years. Present indications for 1949 are that cash receipts from farm marketings may average about 10 per cent below the 1948 record. Realized net income will be down more than cash receipts, but this decline will be offset in part by lower rural living costs. The total cost of farm production will be down slightly in 1949, but on a whole, not more than 5 per cent.

The average farmer still is in a favorable financial position. Farm mortgage debt went up 5 per cent in 1948 and short term credit also increased, but total indebtedness is still below pre-war levels. Demand deposits, or checking accounts, in country banks in February 1949 were one per cent less than a year earlier, but over 4 times as large as in 1941. Time or savings deposits were one per cent larger than a year earlier and over twice as large as in 1941. The amount and rate of savings is starting to decline. Many farmers do not have money in the bank, and their number will now increase as costs stay high and prices drop.

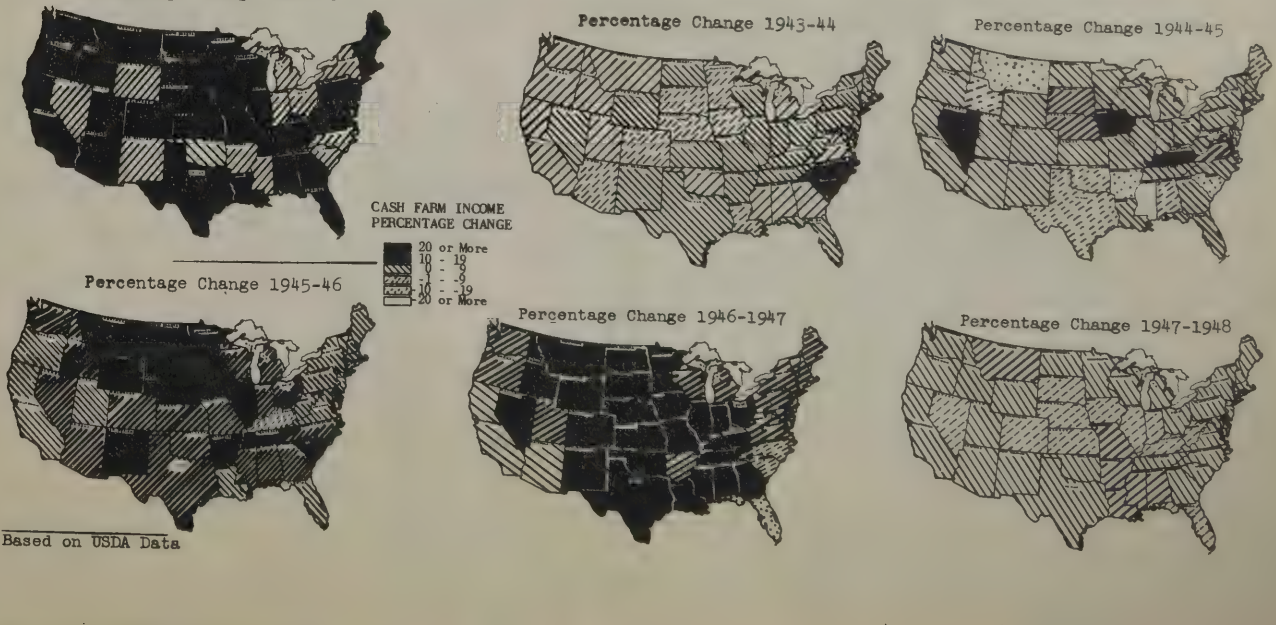
A survey made by the Bureau of Agricultural Economics, since the end of World War II, showed that about 10 per cent of the farmers held 70 per cent of all demand deposits owned by farmers. About 50 per cent of all farm operators held no demand deposits, or checking accounts. The percentage of farmers having no time or savings deposits was even larger. This would indicate that, although most farmers have fewer debts than before the war, less than 50 per cent of them have readily available cash for new purchases.

The demand for both short-term and long-term credit is expected to increase because farm commodity prices drop faster than operating costs. Some lenders are becoming more particular in making loans and are less inclined to finance the purchase of poorer farms on which the buyer can not make a sizable down payment. Businessmen can best serve the interests of the community and of those who need credit by following this pattern, by employing a conservative policy in granting short-term credit, and by scheduling payments for long-term credit on the basis of still lower prices and earnings.

FARM INCOME AND BUSINESS

In rural areas, farm income is the major source of new wealth for the community. In practically all of the towns and small cities in these areas, most business is concerned directly with agricultural products. Even in a large city such as St. Louis, over half of the industry works with the handling and processing of agricultural products. All businessmen should follow closely the outlook for the main sources of farm income in the territory which they serve.

CASH FARM INCOME, PERCENTAGE CHANGE BY YEARS, 1940-48



Percentage Change 1942-43

Percentage Change 1943-44

Percentage Change 1944-45

Percentage Change 1945-46

Percentage Change 1946-1947

Percentage Change 1947-1948

Based on USDA Data

CASH FARM INCOME

CASH FARM INCOME BY STATES FOR 1938 AND 1946-48; BY PRINCIPAL SOURCES, 1947 AND 1948

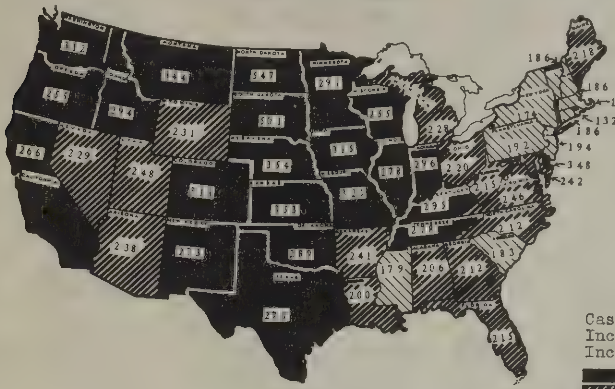
State and Geographic Division	Cash Farm Income Including Government Payments				Income from Livestock		Income from Crops		Government Payments	
	1938	1946	1947	1948	1947	1948	1947	1948	1947	1948
	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000
Maine	49,496	153,801	177,005	192,623	60,830	66,378	114,972	125,039	1,203	1,206
New Hampshire	22,570	51,994	64,492	67,938	48,555	53,291	15,409	14,152	528	495
Vermont	38,025	102,185	115,503	126,801	91,152	104,630	23,280	20,636	1,071	1,535
Massachusetts	73,934	176,689	191,907	208,450	119,224	129,496	71,814	77,975	869	979
Rhode Island	9,357	19,761	22,108	23,686	15,589	16,806	6,391	6,788	128	92
Connecticut	54,276	130,452	147,560	175,055	89,539	100,809	57,371	73,715	650	531
New York	298,798	784,558	878,946	951,680	578,565	655,339	292,463	291,182	7,918	5,159
New Jersey	100,196	252,367	295,523	314,400	169,914	185,744	124,223	127,663	1,386	993
Pennsylvania	258,301	676,261	781,133	841,825	557,486	616,481	216,924	220,026	6,723	5,318
NORTH ATLANTIC	904,953	2,348,068	2,674,177	2,902,458	1,730,854	1,928,974	922,847	957,176	20,476	16,308
Ohio	317,668	884,815	1,007,415	1,033,322	695,914	730,327	301,549	294,885	9,952	8,110
Indiana	273,152	868,848	1,074,471	1,057,427	751,525	762,703	314,622	288,690	8,324	6,034
Illinois	497,248	1,479,926	1,920,620	1,846,299	1,121,689	1,148,744	787,780	687,153	11,151	10,402
Michigan	215,774	663,587	723,761	740,062	446,193	476,091	267,280	255,511	10,288	8,460
Wisconsin	293,383	1,002,449	1,057,649	1,154,117	906,227	1,007,481	142,020	138,361	9,402	8,275
East N. CENTRAL	1,597,225	4,899,625	5,783,916	5,831,227	3,921,548	4,125,346	1,813,251	1,664,600	49,117	41,281
Minnesota	343,050	1,106,770	1,352,996	1,366,395	952,927	996,322	391,181	360,561	8,888	9,512
Iowa	591,712	1,794,680	2,410,111	2,365,481	1,948,017	2,009,470	449,970	345,263	12,124	10,748
Missouri	254,051	892,184	1,095,211	1,203,131	854,693	896,377	228,232	300,356	12,286	6,398
North Dakota	102,175	519,018	718,271	733,045	199,855	203,488	511,602	522,573	6,814	6,984
South Dakota	106,849	513,325	692,177	649,659	397,730	402,458	288,451	242,782	5,996	4,419
Nebraska	215,892	873,039	1,101,918	1,069,406	674,562	701,587	413,788	359,314	13,568	8,505
Kansas	247,715	895,813	1,251,950	1,205,428	582,493	567,439	657,720	630,624	11,737	7,365
WEST N. CENTRAL	1,861,444	6,594,829	8,622,634	8,592,545	5,610,277	5,777,141	2,940,944	2,761,473	71,413	53,931
Delaware	25,108	86,030	87,117	106,869	68,911	89,871	17,613	16,481	593	517
Maryland	68,451	206,780	237,978	248,218	144,446	167,352	90,789	79,206	2,743	1,660
Virginia	125,299	370,321	416,089	452,305	207,425	227,630	202,945	220,635	5,719	4,040
West Virginia	41,109	109,781	120,219	117,694	88,816	88,970	28,518	26,778	2,885	1,946
North Carolina	232,713	762,870	770,406	767,575	135,288	142,558	627,062	617,112	8,056	7,905
South Carolina	100,022	320,197	328,689	338,243	63,488	67,621	261,798	267,362	3,403	3,260
Georgia	158,469	415,518	521,942	544,028	157,176	164,977	356,224	372,656	8,542	6,395
Florida	117,049	418,555	349,760	343,874	91,997	95,939	253,479	244,507	4,284	3,428
SOUTH ATLANTIC	868,220	2,690,052	2,832,200	2,918,806	957,547	1,044,918	1,838,428	1,844,737	36,225	29,151
Kentucky	167,233	454,943	599,695	586,538	287,042	300,912	300,965	277,018	11,688	8,608
Tennessee	140,987	412,995	480,559	508,572	227,470	240,933	246,182	262,026	6,907	5,613
Alabama	123,742	313,796	397,326	438,900	120,363	131,848	272,290	302,902	4,673	4,150
Mississippi	173,166	313,511	496,030	554,003	116,671	126,038	372,532	421,914	6,827	6,051
Arkansas	157,133	445,290	506,841	580,795	153,514	176,871	346,539	399,948	6,788	3,976
Louisiana	124,817	262,633	338,802	371,719	107,434	111,870	222,289	251,291	9,079	8,558
Oklahoma	185,611	501,667	657,962	712,035	335,290	349,057	314,205	357,302	8,467	5,676
Texas	530,398	1,426,106	1,966,456	1,969,452	801,549	870,794	1,140,993	1,082,220	23,914	16,438
SOUTH CENTRAL	1,603,087	4,130,941	5,443,671	5,722,014	2,149,333	2,308,323	3,215,995	3,354,621	78,343	59,070
Montana	76,715	315,327	377,167	420,389	177,393	188,574	192,751	225,277	7,023	6,538
Idaho	86,612	294,958	368,754	371,481	145,747	155,506	216,938	209,034	6,069	6,941
Wyoming	45,296	123,406	153,550	153,766	107,364	107,425	42,564	43,235	3,622	3,106
Colorado	122,457	406,228	528,499	522,174	258,614	269,891	258,564	242,827	11,321	9,456
New Mexico	51,559	150,331	180,615	179,145	102,262	109,825	74,664	66,768	3,689	2,552
Arizona	57,108	172,704	194,007	211,603	71,868	77,091	119,974	131,652	2,165	2,860
Utah	46,262	135,474	158,565	167,437	103,723	109,777	51,719	54,583	3,123	3,077
Nevada	12,261	33,149	46,276	45,507	39,449	39,322	6,423	5,756	404	429
Washington	137,527	524,086	583,509	611,184	192,364	207,858	387,342	399,328	3,803	3,998
Oregon	105,678	349,743	374,863	404,222	170,136	180,145	200,711	219,881	4,016	4,196
California	591,713	2,121,286	2,177,709	2,221,250	751,954	794,743	1,412,751	1,412,896	13,004	13,611
WESTERN	1,333,278	4,626,692	5,143,514	5,308,158	2,120,874	2,240,157	2,964,401	3,011,237	58,239	56,764
U. S. TOTAL	8,168,207	25,290,207	30,500,112	31,275,208	16,490,433	17,424,859	13,695,866	13,593,844	313,813	256,505

USDA DATA

RECORD FARM INCOME CONTINUES

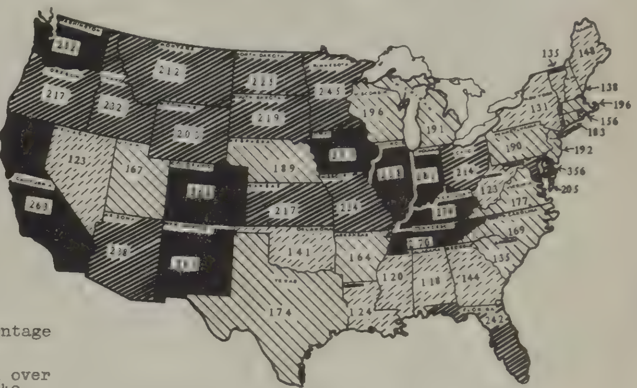
CASH FARM INCOME

Percentage increase in farm income 1947 over 1935-39 average
(Includes Gov. Payments)



CASH FARM INCOME

Percentage increase in farm income 1947 over 1924-29 average
(Includes Gov. Payments)



Cash Farm
Income Percentage
Increase

- ▆ 250 and over
- ▨ 200 - 249
- ▧ 150 - 199
- ▨ 100 - 149
- ☐ 99 or below

CASH FARM INCOME

The above maps show the increase in cash farm income during 1947, as compared to the pre-war period, 1935-39 and the pre-depression period, 1924-29. Cash farm income in 1947 for the country as a whole was 268 per cent above the 1935-39 average and 206 per cent above the 1924-29 average.

Present indications are that cash farm income during 1948 will be high, but net income after subtracting operating costs is expected to be less than last year. U.S.D.A. reports that during the first quarter of 1948, farm income averaged 3 per cent higher than the corresponding period in 1947. Prices for most crops are likely to average lower than last year. If there is a big corn crop as indicated now, net income from livestock feeding operations will be high again this fall. Prospects are very good for a favorable hog-corn ratio.

The average farmer is now in a comparatively favorable financial position. Although both the farm mortgage debt and the volume of short term credit increased in 1947, total indebtness is still far below pre-war levels. Demand deposits in country banks in March 1948 were only 2 per cent higher than a year earlier, but over 4 times as large as in 1941. Time, or savings deposits were 5 per cent higher than a year earlier, over twice as large as in 1941. However, many farmers do not have money in the bank. A survey made by the Bureau of Agricultural Economics, since the end of World War II, showed that about 10 per cent of the farmers held 70 per cent of all demand deposits owned by farmers. About 50 per cent of all farm operators held no demand deposits. The percentage of farmers having no time deposits was even larger. This would indicate that, although the majority of farmers have fewer debts than before the war, only about 50 per cent of them have readily available cash with which to make purchases of machinery, equipment and similar items.

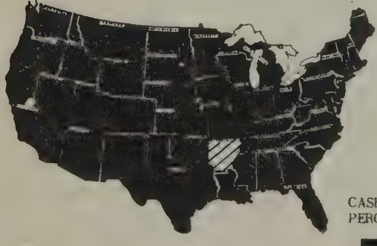
The demand for both short-term and long-term credit is expected to increase as farm operating costs advance and cash reserves are depleted. Businessmen can best serve the interests of the community and of those who need credit by employing a conservative policy in granting short-term credit, and by scheduling payments for long-term credit on the basis of lower prices and reduced earnings in the future.

FARM INCOME AND BUSINESS

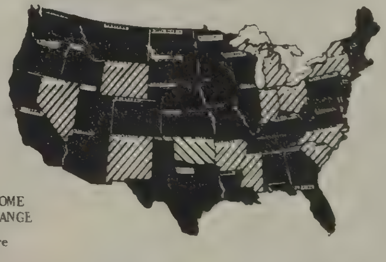
In rural areas, income received by farmers is the major source of income for the community. In practically all of the towns and small cities in these areas, the major share of business is concerned directly with agricultural products. Even in a large urban center such as St. Louis, over 50 per cent of the industry is concerned with the handling and processing of agricultural products. It is, therefore, important for all businessmen to follow closely the outlook for the dominant sources of farm income in the territory which they serve.

CASH FARM INCOME PERCENTAGE CHANGE BY YEARS, 1940 47

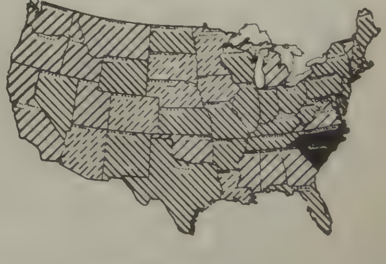
Percentage Change 1941-42



Percentage Change 1942-43



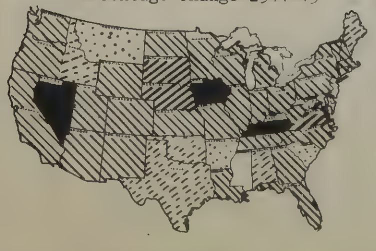
Percentage Change 1943-44



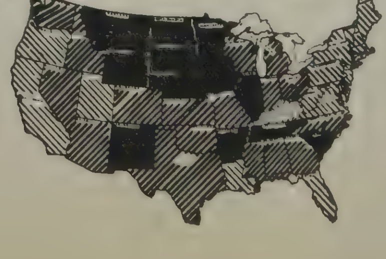
CASH FARM INCOME
PERCENTAGE CHANGE

- ▆ 20 or More
- ▨ 10 - 19
- ▧ 0 - 9
- ▨ -1 - -9
- ▒ -10 - -19
- ☐ -20 or More

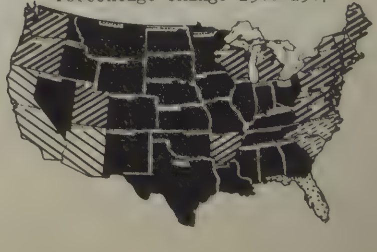
Percentage Change 1944-45



Percentage Change 1945-46



Percentage Change 1946-1947



Based on U.S.D.A. Data

CASH FARM INCOME

CASH FARM INCOME BY STATES FOR 1938 AND 1945-47; BY PRINCIPAL SOURCES 1946 AND 1947

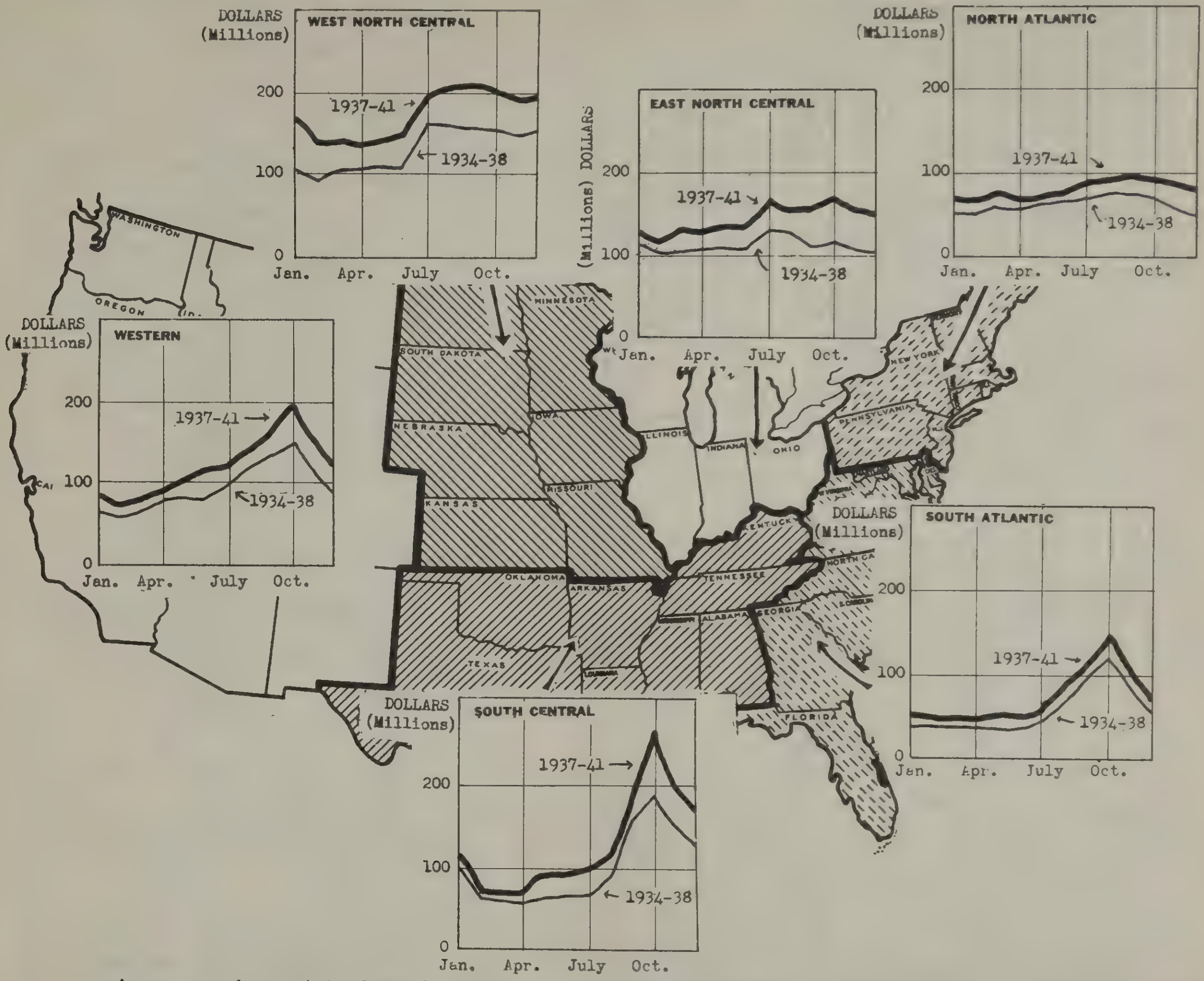
State and Geographic Division	Cash Farm Income Including Government Payments				Income from Livestock		Income from Crops		Government Payments	
	1938	1945	1946	1947	1946	1947	1946	1947	1946	1947
	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000	$1000
Maine	49,496	133,310	153,801	172,889	53,061	62,377	97,532	109,309	3,208	1,203
New Hampshire	22,570	51,483	51,994	59,976	41,130	49,507	9,101	9,941	1,763	528
Vermont	38,025	89,294	102,185	110,514	79,989	92,779	14,668	16,664	7,528	1,071
Massachusetts	73,934	164,646	176,689	194,641	104,967	124,399	66,917	69,373	4,805	869
Rhode Island	9,357	18,716	19,761	22,058	13,227	15,852	5,743	6,078	791	128
Connecticut	54,276	123,658	130,452	146,220	76,961	91,121	49,514	54,449	3,977	650
New York	298,798	726,281	784,558	830,500	509,312	570,996	232,560	251,586	42,686	7,918
New Jersey	100,196	227,018	252,367	280,208	138,413	172,697	107,414	106,125	6,540	1,386
Pennsylvania	258,301	610,038	676,261	773,895	473,785	574,005	175,113	193,167	27,363	6,723
NORTH ATLANTIC	904,953	2,144,444	2,348,068	2,590,901	1,490,845	1,753,733	758,562	816,692	98,661	20,476
Ohio	317,668	764,436	884,815	1,062,437	605,450	764,539	252,354	287,946	27,011	9,952
Indiana	273,152	726,294	868,848	1,088,075	603,222	777,976	243,842	301,775	21,784	8,324
Illinois	497,248	1,225,279	1,479,926	1,880,880	887,739	1,133,237	557,004	736,492	35,183	11,151
Michigan	215,774	552,870	663,587	729,772	399,148	474,333	235,405	245,151	29,034	10,288
Wisconsin	293,383	824,066	1,002,449	1,060,612	816,775	930,654	117,990	120,556	67,684	9,402
EAST N. CENTRAL	1,597,225	4,092,945	4,899,625	5,821,776	3,312,334	4,080,739	1,406,595	1,691,920	180,696	49,117
Minnesota	343,050	900,983	1,106,770	1,344,444	811,281	984,808	243,595	350,748	51,894	8,888
Iowa	591,712	1,547,031	1,794,680	2,381,086	1,439,560	1,942,159	310,172	426,803	44,948	12,124
Missouri	254,051	737,738	892,184	1,092,962	679,729	851,096	187,434	229,580	25,021	12,286
North Dakota	102,175	482,383	519,018	743,741	180,550	239,856	318,042	497,071	20,426	6,814
South Dakota	106,849	436,990	513,325	677,095	312,963	413,642	185,288	257,457	15,074	5,996
Nebraska	215,892	753,347	873,039	1,139,086	563,556	742,491	285,844	383,027	23,639	13,568
Kansas	247,715	813,475	895,813	1,278,408	488,675	625,544	386,918	641,127	20,220	11,737
WEST N. CENTRAL	1,861,444	5,671,947	6,594,829	8,656,822	4,476,314	5,799,596	1,917,293	2,785,813	201,222	71,413
Delaware	25,108	96,917	86,030	82,191	69,213	65,241	15,472	16,357	1,345	593
Maryland	68,451	199,061	206,780	235,974	130,921	148,988	69,696	84,243	6,163	2,743
Virginia	125,299	344,219	370,321	419,190	178,829	214,029	181,771	199,442	9,721	5,719
West Virginia	41,109	96,577	109,781	128,041	79,174	99,443	26,517	25,713	4,090	2,885
North Carolina	232,713	638,414	762,870	752,007	119,799	142,655	633,394	601,296	9,677	8,056
South Carolina	100,022	252,054	320,197	305,985	59,334	59,203	257,159	243,379	3,704	3,403
Georgia	158,469	407,306	415,518	500,623	119,761	149,454	288,345	342,627	7,412	8,542
Florida	117,049	390,541	418,555	358,661	80,247	94,360	332,824	260,017	5,484	4,284
SOUTH ATLANTIC	868,220	2,425,089	2,690,052	2,782,672	837,278	973,373	1,805,178	1,773,074	47,596	36,225
Kentucky	167,233	441,007	454,943	590,946	221,619	283,268	217,747	295,990	15,577	11,688
Tennessee	140,987	353,451	412,995	492,845	182,113	237,578	217,466	248,360	13,416	6,907
Alabama	123,742	286,986	313,796	384,674	100,801	128,132	206,152	251,869	6,843	4,673
Mississippi	173,166	343,582	313,511	480,266	95,642	114,213	207,934	359,226	9,935	6,827
Arkansas	157,133	321,351	445,290	496,789	124,383	160,140	314,151	329,861	6,756	6,788
Louisiana	124,817	271,832	262,633	318,212	82,116	107,605	168,722	201,528	11,795	9,079
Oklahoma	185,611	477,066	501,667	703,472	276,128	376,170	208,666	318,835	16,873	8,467
Texas	530,398	1,315,437	1,426,106	1,998,489	679,765	846,852	707,839	1,127,723	38,502	23,914
SOUTH CENTRAL	1,603,087	3,810,712	4,130,941	5,465,693	1,762,567	2,253,958	2,248,677	3,133,392	119,697	78,343
Montana	76,715	269,255	315,327	404,373	159,406	207,493	144,032	189,857	11,889	7,023
Idaho	86,612	276,128	294,958	365,949	120,586	146,221	164,133	213,659	10,239	6,069
Wyoming	45,296	102,454	123,406	152,443	89,331	111,702	29,457	37,119	4,618	3,622
Colorado	122,547	364,905	406,228	527,975	222,177	276,039	167,009	240,615	17,042	11,321
New Mexico	51,559	124,084	150,331	185,628	92,530	114,228	53,888	67,711	3,913	3,689
Arizona	57,108	143,633	172,704	184,739	58,098	75,443	111,453	107,131	3,153	2,165
Utah	46,262	132,272	135,474	155,072	93,783	106,846	35,819	45,103	5,872	3,123
Nevada	12,261	29,816	33,149	41,348	26,829	35,728	5,527	5,216	793	404
Washington	137,527	497,099	524,086	615,258	166,893	200,126	345,399	411,329	11,794	3,803
Oregon	105,678	338,271	349,743	380,456	150,154	181,248	190,823	195,102	8,766	4,016
California	591,713	1,872,286	2,121,286	2,157,542	609,245	733,035	1,466,312	1,411,503	45,729	13,004
WESTERN	1,333,278	4,150,203	4,626,692	5,170,693	1,789,032	2,188,109	2,713,852	2,924,345	123,808	58,239
U. S. TOTAL	8,168,207	22,295,340	25,290,207	30,488,554	13,668,370	17,049,508	10,850,157	13,125,236	771,680	313,813

DATA OF U.S.D.A.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

WHEN TO SELL AND COLLECT

RECEIPTS FROM THE SALE OF PRINCIPAL FARM PRODUCTS, BY REGIONS (Excludes Government Payments to Farmers)



Average cash receipts from the sale of farm products are shown graphically by regions. While income was much higher in the 1937-41 period than in the 1934-38 period the trends from month to month has been very similar. The only major exception to this general observation is in the East North Central region where higher prices for such major products as hogs and corn plus the introduction of soybeans as a major cash crop has produced a relatively higher level of income for the last 4 months of the year during the 1937-41 period.

Sale and collection programs should not disregard such facts as these graphs reveal. Whether dealing directly with farmers or with merchants and others who deal with farmers, the effect tends to be the same. Sales and collections should be related as much as possible to those periods when farmers are receiving the most income.

In the North Atlantic states there is comparatively little variation in receipts from month to month.

The East North Central states have high and low swings of short duration, with July, August, and October the high income months.

Farmers of the South Atlantic and South Central states receive most of the yearly income during the last four or five months of the year. Note, however, the differences reflected by the graphs.

Receipts are heaviest during the last six months of the year for the West North Central states.

The western states show a different trend line than any other group even though the largest receipts are during the fall months.

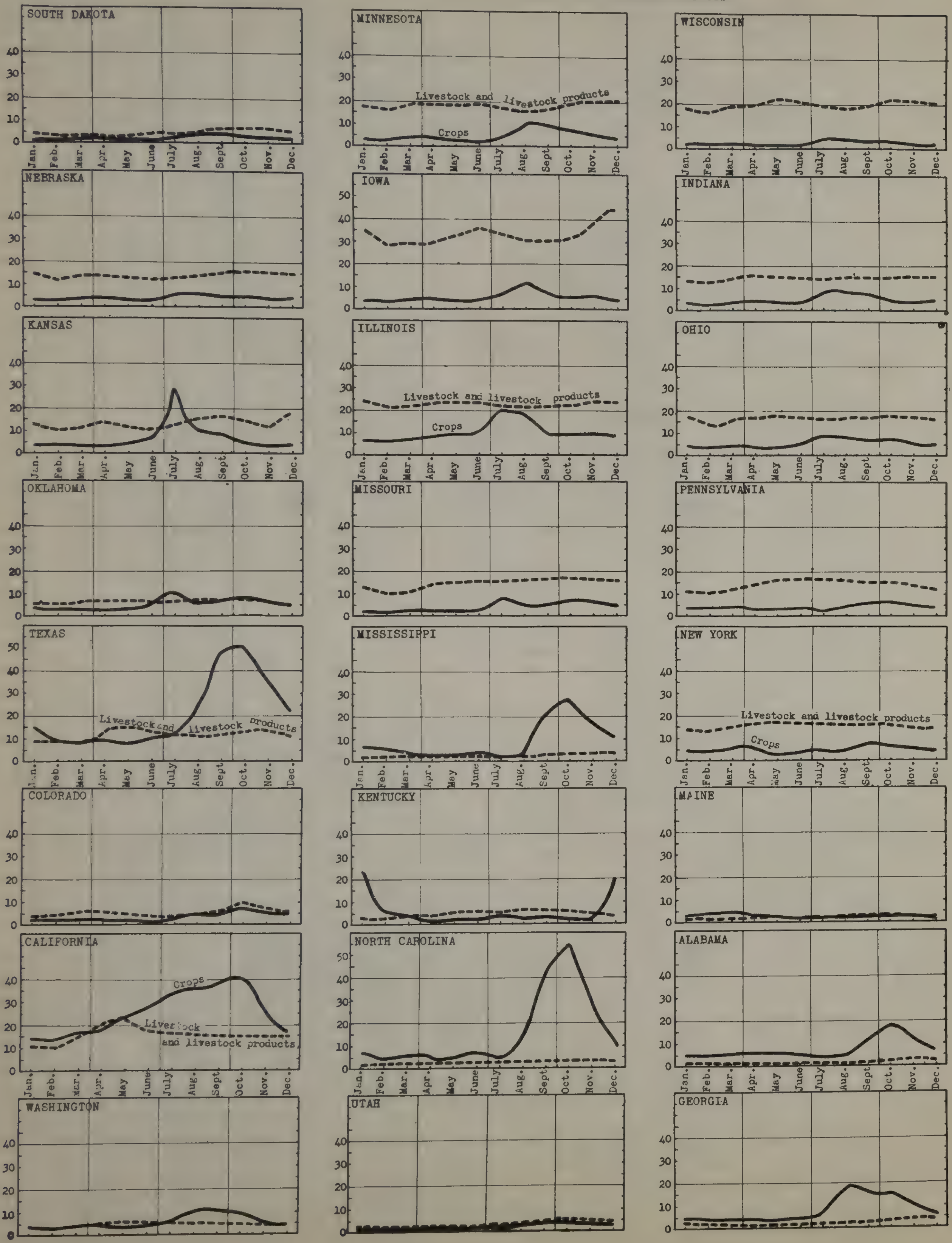
Differences between areas within these divisions may be equally as great as those between divisions. The variations usually depend upon such features as types of farming and crop and livestock areas. These do not follow state lines and can be mapped and dealt with most effectively by areas that disregard arbitrary political boundaries.

Blanket business policies without regard to agricultural territorial differences fail to produce maximum results. The important variations are innumerable, and this page deals with only one.

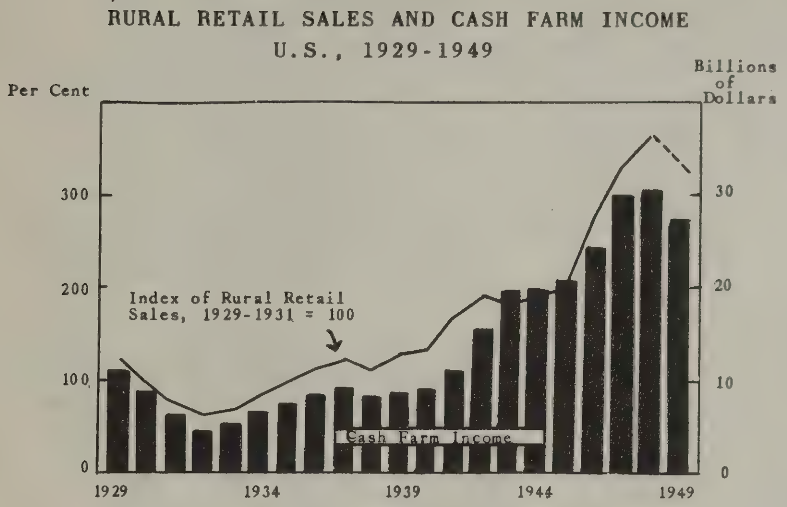
SEASONAL INCOME OF FARMERS

RECEIPTS FROM THE SALE OF FARM PRODUCTS -- 5-YEAR AVERAGE BY MONTHS, 1934-1938, GOVERNMENT PAYMENTS EXCLUDED.

——— CROPS - - - - - - - LIVESTOCK AND LIVESTOCK PRODUCTS



RURAL RETAIL SALES AND CASH FARM INCOME



RURAL RETAIL SALES AND CASH FARM INCOME
U.S., 1929-1949

Bankers, merchants, industries, commercial companies, and other businesses are dependent upon the farm income in their surrounding trade area.

In the past every rise or fall in farm income was followed a short time later by an upward or downward trend in sales volume. The only recent exception to this was during the war years of 1943, '44 and '45. During these years sales volumes remained steady and in some instances were lower even with increased farm income. This is explained by the fact that many consumer goods were not being produced and those goods being produced were in very limited supply. The post war years with industry converting to peacetime production finds a return to the old relationships.

Every businessman and every business firm should be vitally interested in the economic welfare of the farm people with whom they do business. This is one good way for a business firm or an individual businessman to help in securing a high level of economic security for the farmers.

A PROGRESSIVE AGRICULTURE

Not only endorse but get behind and push for the latest and best in agricultural practices. Cooperate with agricultural agencies in sponsoring various rural education programs. Many agricultural practices have been revolutionized in the past decade and it has been through the use of these programs and demonstrations that agriculture has progressed so rapidly. True, the war with its inflationary prices and demand for increased production hurried this by 10 or 15 years.

Such things as soil conservation, balanced farming, hybrid seed production, increasing use of commercial fertilizers, new methods of livestock production, and increased use of machinery were all just getting started before the war and now after a short post war period have boomed farming into Big Business. It is to the advantage of local merchants and businessmen to help carry on these farm programs that will help maintain or increase the productivity of their farming communities. Make it a community that is desirable to live in and one that is progressive.

Community Development work is a big step toward this goal. Through it businessmen and farmers can meet on common ground and create better business relationships. It is only good business to take an active interest in farm problems in your trade area since these problems may well have a bearing on the purchasing power of farmers in the area.

Farms and farm people are no longer self-sufficient as they once were. Most of them no longer use horses for farm power, split rails for fences, cut wood for the kitchen range, churn their own butter, grind their own flour, or make their own clothes. Instead the farmers of today are greatly dependent upon a large amount of consumers goods that help make farm living what it is at the present time. They depend on electricity to do a "thousand and one" jobs around the farmstead. This means a market for all types of electrical appliances. Tractors and machinery demand oil, gasoline and replacement parts. This creates a market for the oil and farm equipment industries. Clothes, various food items, and miscellaneous household goods which were either made in the home or considered unnecessary are now purchased in town.

RURAL RETAIL SALES AND CASH FARM INCOME

What does all of this mean to the businessman and the farmer? It means business in the community. But -- it also means that the farmers' cash costs are much higher than they were thirty years ago or even in the immediate prewar years. The average farmer today has cash costs that exceed his prewar gross income by 1½ times.

As long as total income remains reasonably higher than expenses, farmers will continue to maintain purchasing power and will use it.

But look at what has been happening to net farm income during the past year and a half. The index of prices received by farmers has dropped from a high of 307 in January 1948 to a low of 249 in July 1949. This represents a 19 per cent drop in income. At the same time the index of prices paid by farmers dropped from a high of 251 in August 1948 to 244 in July 1949. This represents a drop of only 3 per cent in prices paid. Therefore, a net farm income has been reduced in a price squeeze which takes away from the farmer a considerable amount of purchasing power. With reduced purchasing power the farmer will tighten his belt. He will tend to become more self-sufficient and cautious with his spending. Current retail sales show that volume is off more than the price decline would warrant.

SALES PROMOTION

Promoting sales for the benefit of farmers is the one big objective of the rural business concerns. Their aim is to serve agriculture most effectively. To do this two basic problems arise. They are: Where and When to Sell.

Where To Sell. Two things will help answer this problem.

I. First -- study the trade territory and take into consideration such features as:

1. Existing demand for the commodity or commodities that are to be sold,
2. Demand that can be created,
3. Future demand trend,
4. The farmer's capacity to buy,
5. Credit stability,
6. Sources of farm income,
7. Time of income,
8. Seasonal relationship between time of use of the commodity and income dates.

II. Second -- shift the emphasis in your sales effort in keeping with current conditions. Farm income from year to year is not static. Within trade territories extremes are regularly encountered showing increases of 10 to 40 per cent over previous years for one type of farm as contrasted to decreases of like amounts for others.

Rural businessmen should study farm income in their trade area and know what has happened in the past so that they can anticipate the future. This can be done by analyzing production and price prospects as compared with the past. Changes in prices, government regulations and production of any major farm product within an area may cause the picture to shift from month to month and from year to year.

Such information is vital to any sales manager who is trying to direct the total sales effort where it will produce the most in the coming season.

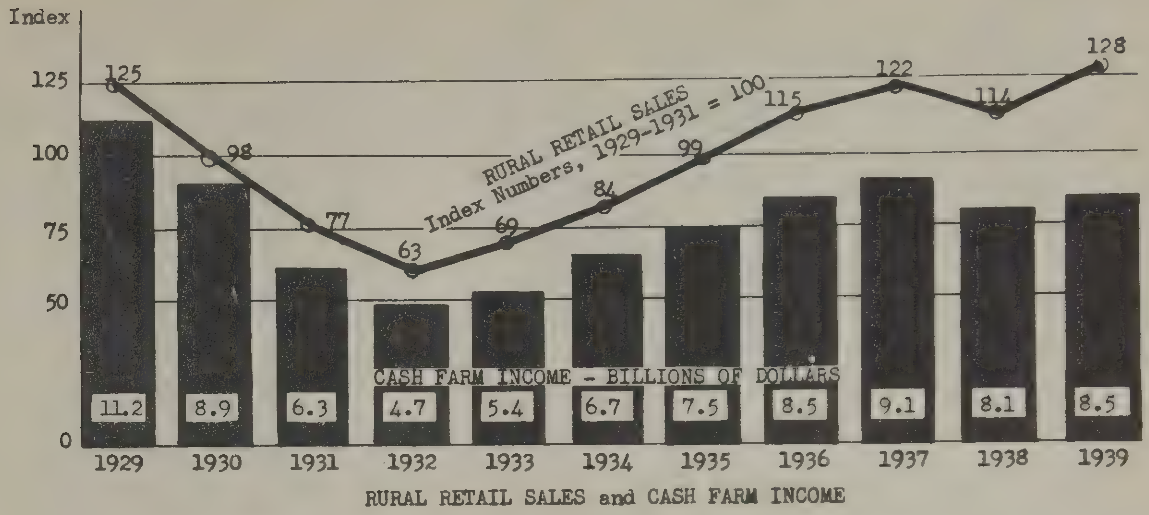
When To Sell from the standpoint of agriculture and farmers appears to be based on at least two major factors:

I. Income dates. These dates vary according to the type of farming area. In a dairy and egg producing region where the farmer receives his checks twice a month, it makes little difference to him about income dates. To the hog and beef cattle producer who sells his hogs and cattle in greatest volume in the fall and winter, income dates are important. (See Page 53-54). That is when he has the money to spend. The cash grain farmer has extra money during the harvest period. He may spend freely just ahead of this date if he has a good credit rating. Not only can sales campaigns be based on these dates but they appear to have a definite place in dictating collection policies.

II. The other major consideration as to when to sell to farmers is to know when farmers in the trade area need most a particular product. For fire and life insurance these may not be a seasonal factor. But, for such items as tractors and other farm implements, seed, fertilizer, and feed, there are definite times of the year when these are in most demand.

Every trade territory has its own particular problem. But, the important thing is to anticipate farm needs and plan to supply them.

SALES VOLUME DEPENDS ON FARM INCOME



RURAL RETAIL SALES and CASH FARM INCOME

The dependence of sales in rural areas on the amount of cash farm income is clearly shown on the accompanying graph. This is a fact of which industrial and commercial organizations are aware but which appears to be rather consistently disregarded in planning and directing sales programs.

Various pages of the Digest regularly carry facts which can be used by sales managers and executives in anticipating the trend of future cash farm income and thus point their sales and production efforts to the areas and items that will give the largest volume. Note page 1 showing by areas the Past and Future Farm Income. Pages 111, 121, 122, and annual forecasts bear directly on the subject. The monthly Special Messages indicate the future price and production trends of major products, hence the probable future buying power by areas. Such current information should be studied by referring to the type-of-farming maps in chapter 750 to see what areas will be primarily affected by the price and production changes.

MARKETS - WHERE AND WHEN IS THE BEST TIME TO SELL

The editor, in speaking recently before the Sales Managers' Bureau of the St. Louis Chamber of Commerce on the foregoing subject, emphasized the following points:

In regions dominated by agriculture the effective administration of most business programs is dependent upon plans adapted to specific areas. There is such a tremendous difference between the economic and income characteristics of various territories that to disregard this fact is costly.

In recent years a great amount of time has been given to the study and mapping of farm loan territories and to area analysis for other business uses. Thousands of calculations have gone into studies leading to a single territorial map. Once the territories are established very specific programs can be set up for each designated territory, and these programs can be designed for the particular business.

Among other things these studies indicate the volume of business to be expected from a region and the costs and procedure to obtain it. This approach is especially effective in the administration of sales. Whether sales are made directly to farmers or indirectly to them through dealers, or merely to industries and professions within agricultural regions, a knowledge of the farm resources and a knowledge of the source, time, and extent of farm income is fundamental to maximum sales. To be most effective any such analysis must be pointed directly to the selling of the specific commodity, merchandise, or service that is to be sold.

Source of figures for graph —
National Industrial Conference Board Inc.

MARKETS – WHERE AND WHEN IS THE BEST TIME TO SELL

Where To Sell

As to where to sell, it would appear that two basic procedures should be followed:

I. Make basic maps of trade territories for the commodity or commodities that are to be sold. These would be rather permanent, and around them would be built the plans from year to year.

It is certain that these trade territories would seldom, if ever, follow arbitrary political lines such as state or county boundaries. In many cases they would be most apt to adhere more closely to type-of-farming areas and maps delineating regions within which farm enterprises are similar or are basically uniform as bearing upon the particular sales program.

The mapping of farm loan territories is an example of a basic map developed as a foundation for the specific purpose of administering a farm loan business.

These basic maps will take into account such features as:

1. Existing demand for the commodity or commodities that are to be sold,
2. Demand that can be created,
3. Future demand trend,
4. Capacity to buy,
5. Credit stability,
6. Sources of income,
7. Time of income,
8. Seasonal relationship between time of use of the product and income dates.

For most businesses such basic maps would divide into several sales territories, the regions in which a business operates.

II. The second procedure in deciding where to sell is to shift the emphasis in keeping with current conditions.

Refer to Digest Page 1. The top map clearly shows that farm income from year to year is not static. Within trade territories extremes are regularly encountered showing increases of 30 to 40 per cent over previous years as contrasted to decreases of like amounts for other areas.

It is interesting and important to know what has happened but even more practical to try to anticipate the future - hence the lower map. This is based on an analysis of both production and price prospects as compared with the past. Note that the area lines cut state lines in many directions. The price or production change of any major farm product within an area may cause the picture to shift from month to month.

Such information would appear vital to any sales manager who wishes to direct the major sales publicity and effort where it has the best chance of cashing in for the coming season.

The practicability of such maps is well illustrated by a company that came to us last summer and said that they were planning a special sales campaign for three states and wanted to know what the farm income prospect was for these states. A study resulted in a report that was most discouraging regarding practically all of two of the states and about one-fourth of the other state. It showed for one state in particular that it would be an extremely poor year for all but about one-fourth of the state. Needless to say the report caused very decided changes in the sales plans for the company.

It would be interesting to know how many sales managers have been greatly concerned with the price of hogs and the size of the pig crop during the past year. Anyone selling in rural areas throughout the Corn Belt should profit greatly by following closely this type of information. More than one-fourth, 27 per cent, of Missouri farm income normally comes from hogs. Most people perhaps think of the state as a corn and wheat region, but sales of these crops contribute only a relatively small proportion of the cash income as compared with hogs.

These suggestions as to where to sell are briefly:

I. Have basic trade territory maps and policies for your particular commodities.

II. Shift the emphasis from year to year and even month to month to take full advantage of the current situation.

When To Sell

When to sell from the standpoint of agriculture appears to be based on at least two major considerations:

I. Income Dates. Digest Pages 121 and 122 throw important light on this subject. In working out the details by areas the income dates should be studied by commodities. Hogs, for instance, normally sell in largest volume during the fall and winter; whereas wheat is sold immediately following harvest in the summer. Such income dates can be specifically mapped by area.

Regardless of the extent to which this information is used in regulating the time of sale it appears to have a definite place in dictating the collection policies.

II. The other major consideration as to when to sell is to know when the farmers of a particular area need most the particular product you have to sell. For life insurance that may not be a seasonal factor. For such items as tractors and other farm implements, seed, fertilizer, and feed, there are definite times of the year when these are most in demand.

Briefly, the major considerations in planning time of sale from the standpoint of the trade territory have to do with:

1. The time at which the farmer has the net income with which to buy;
2. The period of the year when he needs the product that is being sold.

It would appear that there is an answer to the question eternally facing business executives and sales managers - when and where is the best time to sell. There are vast quantities of statistics bearing on this question waiting only to be analyzed and pointed to the specific problem of any company with commodities to sell. It is the intention that the Digest will continue to make large contributions of general information bearing on this subject.

TOWN-COUNTRY DEVELOPMENT

Agriculturally, our nation is moving out of the pioneering stage and is taking on maturity. Definite patterns of operation are being established in each community. Often they are destructive rather than constructive.

Today's biggest challenge and opportunity for organizations and businessmen is building a program for a permanently progressive community. Then, through the years, guide it toward the ultimate objectives.

Each community can determine its own future. Some will grow and prosper like well-planned and aggressively-managed business firms. Other communities will wither and the towns that serve them will die. Those communities that will prosper must plan for the future so as to make maximum use of their resources.

Similar situations are encountered on many farms and ranches. Many properties are just being farmed with no plan or definite management program.

To develop a sound operation on such a farm, a detailed study must be made to get a clear picture of the available resources. From this complete assembly of facts, a management plan is set up. It is a long-time program, guiding the future development and operation to achieve maximum returns over a long period.

In like manner, a community can be managed to obtain maximum results. But they must make a fresh start by doing the following:

- Make a community survey.
- Formulate a program.
- Manage that program.

A Complete Survey of all physical, biological, social, and economic factors that affect the area is the first step. An objective study of all facts is necessary if an effective program is to be developed. This will include such problems as the following:

An analysis of ways in which the community or trade area functions should be made. What are the business enterprises? How do they function? What crops and livestock are produced? Where are they sold and processed? What is the market? What are the transportation facilities and how do they function? From a farming standpoint, it is especially important to map the types of farms and farming areas.

What type of people live in the community and trade area? What are their nationalities and occupations? What is the general level of education, and to what degree are the workers trained in crafts and trades?

The Basic Program, the second step, must be developed from the facts revealed by the survey. Specific objectives must be set up to guide continuing developments.

Many people can gather facts and make beautiful maps and imposing tables of figures, but they do not know how to put them to use. That is the most difficult and important step.

From the survey and analysis of the trade area should come basic programs such as:

- → Type-of-farming
- → Livestock program
- → Cropping program
- → Soil conservation program
- → Industry to process farm commodities.
- → Non-agricultural industry to furnish employment for surplus or seasonal labor.
- → Improved community-wide, social, health, recreation, church, home, government, and other activities.

Community Management--The third important step in town-country development is management or administration. No plan or program will work by itself. It must be well managed and receive constant attention to be successful.

Ideal management is through leading civic organizations with an executive to administer the program. Markets and processing plants must mesh with the production of farm products. New industries and businesses which are needed will require promotion. Revisions of the community plan will be necessary from time to time to meet changing conditions.

THE DIVIDENDS

To determine what results we might expect from Town-Country Development, let's look at what other communities have done.

Excerpts from an editorial appearing in The State entitled "Buncombe Props the Third Leg of Its Stool" have the following comments:

"**Asheville, N. C.** had almost forgotten that its most stable asset was agriculture. Today, farming is the area's secret weapon.

"For a period of years the business people became primarily interested in the promotion and development of industry and the tourist trade, with the development of agriculture being left entirely up to the rural citizens and the various agricultural agencies.

"New and better marketing and processing facilities for farm products were needed and it

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TOWN-COUNTRY DEVELOPMENT

was oftentimes difficult for county agents and other agricultural agencies to raise the necessary capital to promote various projects needed in developing the agricultural resources of the area.

"The Asheville Agricultural Development Council has built a long-range farm program designed to keep pace with the revitalized industrial and recreational program. The council is financed entirely by businesses and industries of Asheville and local farmers. It has one purpose and that is to increase the farm income of western North Carolina.

"Businessmen who put money into this program feel that by doing so they are investing in a more balanced and prosperous economy for the whole Asheville area as well as their own economic health."

Some of the results are:

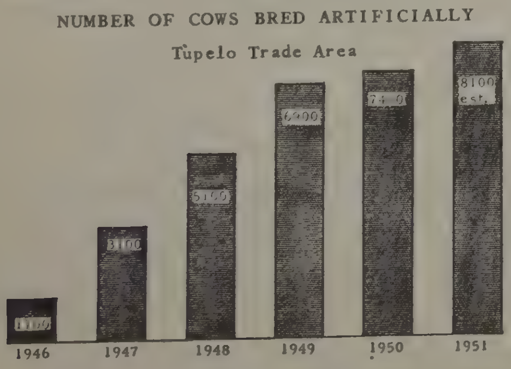
- 346 new Grade A dairies in 4 years.
- 2 million broilers grown in 1951, an increase in income of $1,250,000 over 1948.
- A new show barn and indoor pavilion.

Tupelo, Miss. --A study by the Agricultural Institute reported on, -- "Five Year Dividends -- and the Challenge".

"The decay of many rural towns is an impelling reason for areas like Tupelo to plan for the future development of their trade areas. If the incomes of both town and country people are built up and living conditions improved, people will remain in such areas and the towns will grow and businesses thrive.

"Tupelo, by aggressive leadership, has grown -- while thousands of rural towns have gone backward or have shown little progress.

"The Community Development Foundation is unquestionably making a major contribution in insuring future progress for the Tupelo area. Future developments should be even more rapid because of the sound work of the first five years."



The growth of the artificial breeding is a major achievement of the Community Development Foundation.

Some of the results are:

→ 2,039 families in organized communities.

→ 2,617 more pounds of milk now sold per cow in organized communities compared to state average.

→ 8,100 cows bred artificially in 1951.

→ 28 organized communities in 1951 compared to 3 in 1947.

Businessmen and farmers are quick to realize that such records mean: ☞ "Increased business for towns, and increased income for farmers."

At Beckley, W. Va. A Post-Herald editorial concerning town-country development progress said:

"The result was a carefully-designed, long-range plan designed to strengthen the area's economy by increasing agricultural income. After three years of operation, it is well to review the results.

"We cite these gains in two major agricultural pursuits -- poultry and dairying:

"Total production of broilers for the year 1952 will be 900,200 birds.

"Bear this in mind -- $900,000 gross income to the area and $150,000 net income to farmers will be had at the end of 1952 which was not here in 1951. This is a new industry and does not reduce nor retard any other existing business.

"The Dairy Commission has been successful in two major projects which will increase the income of dairymen by many thousands of dollars every year. We refer to the Artificial Breeding Cooperative and the Dairy Herd Improvement Association."

The chairman of the Dairy Commission presented figures on what artificial breeding means to 112 dairymen enrolled in this program.

"On the basis of the present enrollment in the ABC unit, the dollars and cents gain to dairymen over a five-year period is estimated at $408,000.

"It would be difficult to say in dollars, just how much DHIA is worth to the economy of the area. At least two dairymen have said that it is of greater economic importance to them than artificial breeding."

Probably more important than the three examples listed above are the benefits received by the people in these communities. The improvement in their social, spiritual, educational and living standards can't be measured in dollars and cents.

The town-country development programs cited above were developed with assistance of Doane Agricultural Service, Inc. If you have further questions about town-country problems, feel free to contact our Research Department.

RURAL COMMUNITY DEVELOPMENT

This nation is in the throes of a tremendous agricultural revolution. The war has partly obscured the fact. The full impact will burst upon us in the reconstruction days ahead.

The problem of agricultural surpluses has not been solved. After five years of the most destructive of all wars, there are great surpluses of cotton, wool, and wheat. Hogs and eggs have been produced in such vast quantities that they broke the markets in spite of government support. Other crops like vegetables and dried peas have been plowed up or used as livestock feed. Hybrid corn and various other disease resistant and high yielding crops, with increased use of fertilizers, have greatly increased crop yields. Mechanization has increased both the yields per acre and per man and has been a major cause of decreased employment in agriculture and reduced population in some rural communities.

The South faces major problems and tremendous adjustments. It will take wise and vigorous action by many communities and agricultural areas if disaster is to be averted. Synthetic fibres will invade further the cotton markets. Mechanical cotton picking will release labor that will hang like a dead weight over many communities and will become a national problem of first importance, unless a solution not yet provided is promptly put into effect.

Wherein lies hope? Certainly, there will be no permanent or satisfactory political solution. Such must come from within agriculture with the aggressive application of the talent of all those who serve farmers. Until the solution comes from such sources, the economic ills of agriculture will continue to receive political panaceas to the detriment of all.

American farms are businesses. As such they can be most profitable only when operated at optimum capacity. In this they are no different than industry which does not prosper when shut down or running only a few days each week.

Any agricultural program, therefore, that is most effective must provide for a large, not restricted, volume of production. The growth and prosperity of any rural community will be cut to the extent of any reduction of the most profitable agricultural enterprises of the trade area.

Each rural community should spur its own destiny. Some will grow and prosper like well planned and aggressively managed businesses. Other communities, like other businesses, will wither and the towns that serve them will die. In the vigorous competition that lies ahead, those communities that will prosper most will plan for the future in a way which will make maximum use of its resources. The fate of any community dare not be left to chance.

Like "Topsy", communities and trade areas have just "growed". All too often, they are still in pioneer stages. Natural wealth is being wasted; businesses feed on the present situation, whatever that may be; there is no plan; the "Topsy" communities continue to be awkward, misshapened growths.

What a challenge for commercial organizations and businesses with vision! Nothing could be more fascinating and productive of greater benefit than building a program for a permanently progressive community and then, through the years, moulding it to fit the pattern.

It is the same experience which we have on a smaller scale when a new client comes to us with a farm, plantation or a ranch to manage. Invariably, the property is just being farmed - no plan - no definite program. First, a detailed plat is made to get a clear picture of the size, shape and nature of what we are to manage. It is analyzed with detailed soil maps, tests, field plats, productivity tables and a study of present buildings and improvements. The community and markets are investigated. Out of this complete assembly of facts, there is brought forth a farm management plan for that farm or ranch. Crop rotations and livestock programs are established, soil treatments are specified, relocations of fences, roads and buildings are planned and the ultimate schemes of such developments as drainage, erosion control and irrigation are provided. It is a long-time program, an architectural design, if you please, to guide the future developments and operations of the property to achieve maximum results.

In the same way, those who are community managers, if they are to obtain maximum results, must make a fresh start.

The first step is a complete survey of all physical, biological, social, economic and other factors affecting the area. An intelligent and objective study of all facts is necessary if an effective program is to be built.

The second step is the drafting of the community plan and basic program. Management cannot function effectively without a program which clearly sets out the goals and the way in which they are to be reached.

Address given by True D. Morse, President Doane Agricultural Service, Inc. July 27, 1944 Before Southwestern Institute for Commercial Organization Executives, Dallas, Texas, sponsored by State Secretaries' Association of the Southwest, the Chamber of Commerce of the United States, and the Southern Commercial Secretaries' Association.

The third step is the long-time administration of the program. All that is done through the years must be made to conform to the basic plan. Any community that would make the most effective growth and development must be constantly guided toward the ultimate objective.

I. COMMUNITY SURVEY

The study necessary to assemble the facts on a community or trade area should proceed along the following lines:

1. BOUNDARIES OF COMMUNITY OR TRADE AREA

A logical first approach is an exploratory study of a broad area to determine,

(a) Present community boundaries, and
(b) Natural or logical limits. Often these will not be the same as present boundaries.

In some cases, primary and secondary areas may exist which should be mapped.

2. NATURAL PHYSICAL FACTORS

Basic physical features that usually remain fixed should be mapped. Future plans and programs for rural communities must be based on these. They include such as,

(a) Topography
(b) Geological formations
(c) Soils
(d) Natural resources, such as mineral, oil, timber, water and parks or scenic formations.

3. CLIMATIC FACTORS

These include temperatures, length of growing season, rainfall and prevalence of storms like hail and cyclones.

4. GOVERNMENT AND GOVERNMENTAL AGENCIES

The government and the way it functions locally must be shown in any complete basic report. Any bureaus or agents that operate in the community or trade area are important considerations. These include peace officers and courts, town and county officials, state and federal employees such as county agricultural agents, A.A.A. workers, and health agencies.

5. PUBLIC DEVELOPMENTS

The developments based on community or governmental action should be separately shown. Familiar items are roads, schools, churches, hospitals, parks and drainage.

6. PRIVATE DEVELOPMENTS

These include all property of companies and individuals. They should be studied as,

(a) Town or urban property, and
(b) Farm property

Particular attention should be given to improvements such as buildings and their permanency.

7. ECONOMIC FUNCTIONS

The way in which the community or trade area functions economically should be analyzed. What are the business enterprises? How do they function? What crops and livestock are produced? Where are they sold and processed? What is the basis of the markets? What are the transportation facilities and how do they function? From a farming standpoint, it is especially important to map the existing types of farming areas and to gather facts on farms by farm types.

8. PEOPLE

Who make up the personnel of the community or trade area? What are the nationalities and occupations? What is the level of education and to what degree are the workers trained in crafts and trades?

9. FINANCES

The financial resources, as well as existing indebtedness, both public and private, should be shown.

10. OTHER FACTORS

Obviously, the foregoing suggests only the general nature of the study to be made. It should include all factors which tend to limit or extend the future developments of the community or trade area. The effectiveness of the ultimate program may be limited to the extent that any important features are omitted from the basic study.

II. PROGRAM

The making of a community survey or study such as has been discussed is merely the beginning. Little will be accomplished if the work stops at that point. Too often that is where it does bog down and stop.

A lot of people can gather facts and make beautiful maps and important looking tables of figures, but do not know how to put them to use. That is indeed a most difficult and important step. Maps and figures may be virtually useless unless they are used to build an action program.

Millions of dollars have been uselessly spent by planning boards and other agencies on surveys which never got past the survey stage. A start should never be made if only a study or survey is contemplated. Those placed in charge must be capable of weighing all facts revealed by the study and setting up a specific program to guide continuing developments.

To illustrate, we must again draw on our own experience. Large lending organizations came to us during and following the depression for help in setting up their future farm loan programs. A part of the work involved the making of State studies. Thousands of statistical figures and over 150 maps for each state were included in the final reports. A measuring process was developed to reflect the influence of the various factors. The final product was a farm loan territory map for each state. For each territory, there were policies to be followed in making farm or ranch loans adapted to the specific area and its debt-carrying capacity.

Out of the survey and study of a community or trade area should come such basic maps and programs as the following:

1. TYPE-OF-FARMING MAP

This should be the adapted type of farming and not the present kind of farming being done. It should show the farm pattern that will produce the most income for farmers over an indefinite period of years. That which produces the most wealth for the farmers will produce the most prosperity for the towns and cities that serve the farming area.

RURAL COMMUNITY DEVELOPMENT

(Continued from p. 82)

Ultimately, these maps should be in sufficient detail to show the best adaptation for each farm, ranch or plantation within the trade area.

Implement dealers should use such maps as a guide to the right kind and size of equipment to sell to each farmer.

Electric companies would find them effective guides to the kind of power and equipment that should be installed. Too often they now render a dis-service by encouraging the purchase of items not adapted to the most effective type of farming.

Banks could develop standardized basic farm finance plans, one for each of the types of farms in the trade area. When a farmer came to the bank to plan his finances or to arrange for a loan, he would receive the very best of financial guidance, based on a plan created for his type of farming. Such will go a long way in encouraging him to follow the most effective farm management program for his farm. Such banking operations would insure a maximum farm loan business on a safe basis.

2. SOIL MAPS

Soils are basic and the extent of the prosperity that any farming community or trade area can attain is often set by the soils. Each soil type should be shown along with its crop adaptations and the specific treatment that it should receive.

Fertilizer and implement sales and farm financing for maximum community developments should be keyed to soils.

3. CROP PROGRAMS

Adapted crops and crop varieties should be known and the entire community efforts should be concentrated on the maximum production of such crops.

4. LIVESTOCK PROGRAMS

The basic plan should show the adapted kinds and breeds of livestock and poultry. The influence of all community leaders should then be concentrated on the kinds of livestock and poultry which will produce the most long-time income. This will go a long way in keeping some zealous businessman or farmer from promoting Holstein cows in an area where Jerseys are best adapted, or dairy cattle in a region where beef cattle will obtain best results, or the converse. Standardization of crop varieties, and livestock breeds is an advantage to producers and can only be accomplished by community action.

5. VERTICAL FARM DIVERSIFICATION

A basic characteristic of farming is that it is a raw material producing industry. As such it is subject to low pay and violent price fluctuations. Those who are closest to primary production usually have small incomes as compared with industry, commerce and finance.

As long as farmers continue to be primarily producers of raw materials, most of them will remain near the economic level of peasantry. That has been the general pattern of earning and living for most farmers down through the ages. It will continue until a more constructive program becomes effective. This is one of the big opportunities in rural community development; hence an extended statement is being made in regard to it.

For generations authorities have urged upon farmers the need for the balance of operation and security that comes from diversifying. The method advocated is the production of a variety of products. Instead of primarily growing just one crop such as cotton or wheat, the farmer has been told to spread labor and equipment use and obtain income from more than one source. That is diversification on a horizontal plane. To put it into practice too often requires reduction of the most profitable crops or enterprises. The net effect may be a major loss in profits.

Vertical farm diversification operates in another direction. After producing a raw product, diversification comes by processing, packaging, or special marketing, or the activity may be in connection with items and services required for production. The farmer takes over some of the functions of industry and trade. Much of the activities now visualized will take the form of rural industry. It diversifies the work of farmers. It diversifies their income. The results are far reaching and will greatly improve the economic status of the farmer of tomorrow.

KITCHSHOPS in the home can be used for home processing. We conceive them to be a room or small building within which the housewife, the daughters, and domestic help will process food, both for home use and/or for sale. There will be much new equipment that will fit into such Kitchshops. Grinding equipment can be used for breakfast foods, flour and meal. Pressure cookers for cooking and canning will probably be in every Kitchshop with the most effective equipment for canning, freezing or drying many types of products. In some cases, miniature canning factories will make possible volume of production of home specialties, fruit, poultry, other meats, and vegetables.

Kitchshops will make possible income for farm girls which is now so seriously needed. Much of the urge to leave the farm for more money can be removed. There the farm girl can create and prepare both staples and specialties. With efficient equipment she can package many items ready for sale.

FARMFAC has been used to designate the farm factory where vertical farm diversification is extensively employed on a farm. Farms are now equipped with much storage. There needs to be added, in many cases, only the factory buildings through which products will flow for processing. In ideal situations these operations will fit into those seasons of the year when labor is most available. It will help provide more regular employment. It will increase income.

Each year 1,750,000 farmers seek off-farm employment. In 1939 there were about 29 per cent of the farmers of the United States who worked part-time off their farms for pay or income. They averaged 137 days out of the year. The average for 1929 was 100. This is an average increase of 37 days per year for each operator. Over 12 per cent of all farm operators work off their farms 100 days or more per year. Farm factors can provide work for much of this surplus farm labor.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

RURAL COMMUNITY DEVELOPMENT

When farm processing becomes general, many will not have to leave their farms for extra work. If they do not have their own farm factory they may find employment in that of a neighbor's.

The possibilities are unlimited. The primary need is for effective equipment. Witness what happens to milk in its travel from the farm to the city home. It's cooled, it's heated, it's cooled again, it's modified, standardized, loaded, transported, unloaded, packaged, loaded and unloaded until handling and numerous treatment costs add greatly to its ultimate price, hence decreasing its consumption.

Apparently, the day will come when the warm milk from the cow will go to a separator, then to a dryer, after which it will be packaged and shipped by parcel post to the city customer who will purchase a month's supply at one time. The pure fat will go into another container and with both products, the housewife will always have at hand skimmed milk, 20% cream or any other proportion desired. This short cutting of laws, labor unions, and multiple processing and handling bids fair to revolutionize the dairy industry.

6. RURAL INDUSTRY

Community processing should be developed to handle those jobs too complicated or too costly in equipment for individual farms. Cooperative organizations will be the type that will own and operate many of these plants. They will be merely the expansion of the successful cooperative efforts which have resulted in threshing machine rings, creameries, cheese factories, mills, elevators and other such rural enterprises for handling and processing farm products. Many others will be owned and operated by private enterprises.

Agriculture waits only for practical machines with which to decentralize much of the industry built about farm products. This development will be a boom to the rural nonfarm population that is definitely dependent upon and related to agriculture. This is about one-fourth of the nation's total population. Community processing will add further opportunities for part-time employment for farmers.

As one authority states, "The development of small industries which can operate efficiently close to a local raw material supply is the best hope for maintaining the population of rural areas."

Any sound developments that increase the prosperity of the farmers and of rural communities means more trade and industry for the cities. The farm and city interests will both be served.

The increased buying power will flow to the cities. Urban factories must make the needed processing plants. Final refining, packaging, and merchandising,will, in many cases, be left to large industrial plants and city business.

7. IMPORTANT POST-WAR STRATEGY

There will come out of this war a host of rural youths highly trained mechanically. They will have the urge to return to the farm. They will need new ideas and progressive programs to challenge and hold their interests. They will have the mechanical ability to operate the Farmfacs and rural industry. It will be extremely important that they find on farms, and in rural communities, opportunities for work and expression of abilities. The alternate drifting to the cities, which will already be badly overcrowded, will add to the vicious national problem of unemployment which is certain to come with the return of peace.

8. NON-AGRICULTURAL INDUSTRY

The basic study will serve as an effective guide to the need for non-agricultural industries in a community. If such are needed, the adapted kinds should be indicated.

Of first importance in most dominant rural areas is the development of processing plants and industries using the products of the farm or making and processing items for use on the farm.

9. NON-ECONOMIC ACTIVITIES

Increasing the earnings of the people in an area is only a means to an end, not an end in itself. In addition to a program for making a better living, the following programs should also be developed for living a better life.

1. Health
2. Recreation
3. Religion
4. Home
5. Government

III. COMMUNITY MANAGEMENT

The third and equally important step in community development is management or administration. No plan or program will work by itself. It must be well managed and receive regular attention if the most is to be accomplished.

The ideal management is through the leading civic organizations such as the Chamber of Commerce. Some executive must administer the program. Markets and processing plants must coincide with the production of farm products. New industries and businesses which are needed will require promotion. There will need to be revisions of the community plan from time to time to meet changing conditions.

There is valuable help available in most communities that will welcome the opportunity to work with such community development. Outstanding among these are the Agricultural Extension Services of the Agricultural Colleges. Through their state workers and county agents they can help with all phases of the agricultural developments.

TRADE AREA APPROACH

There is the opportunity for business companies to use a similar approach to the development of their trade area. For example, a bank or a power company can map its trade area according to type-of-farming and other characteristics and build programs for the guidance of the business. Such will not only produce more business and increased profits, but will render a constructive service to the trade area.

THE DIVIDENDS

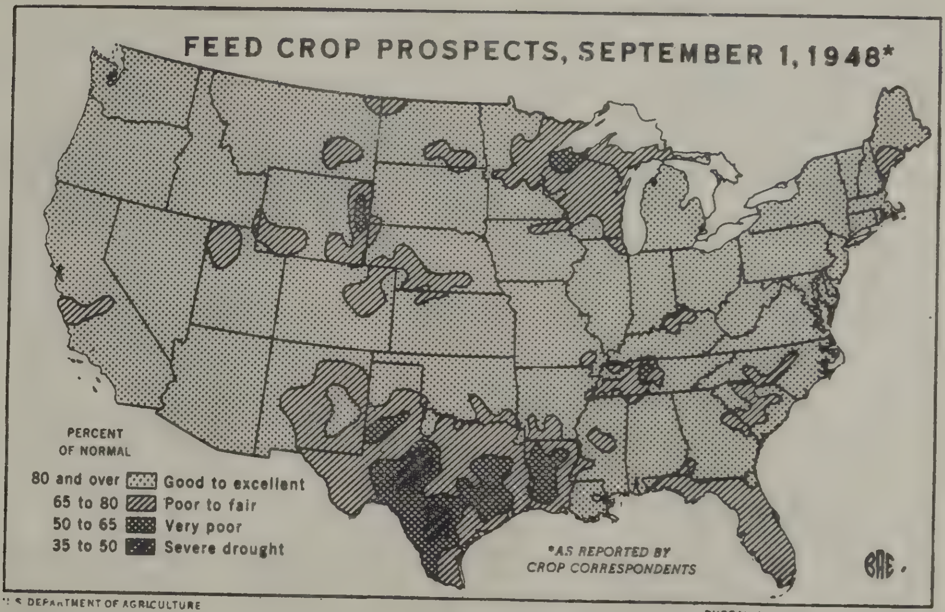
Agriculturally, our nation is moving out of the pioneering stage and is taking on maturity. Definite patterns of operation are becoming fastened upon each community. Often they are far from the best. Often they are destructive, rather than constructive.

Certainly, every rural community should be virtually concerned that its development is in the direction which will make maximum use of its agricultural and other opportunities. "Topsy" growth should no longer be tolerated. Planned and efficiently managed communities will pay big dividends in more income and a high level of educational,cultural and religious development. They will be solid bulwarks against economic, social and political upheavals that will wreck many communities and threaten the future of the United States.

100 Crops

100 Crops

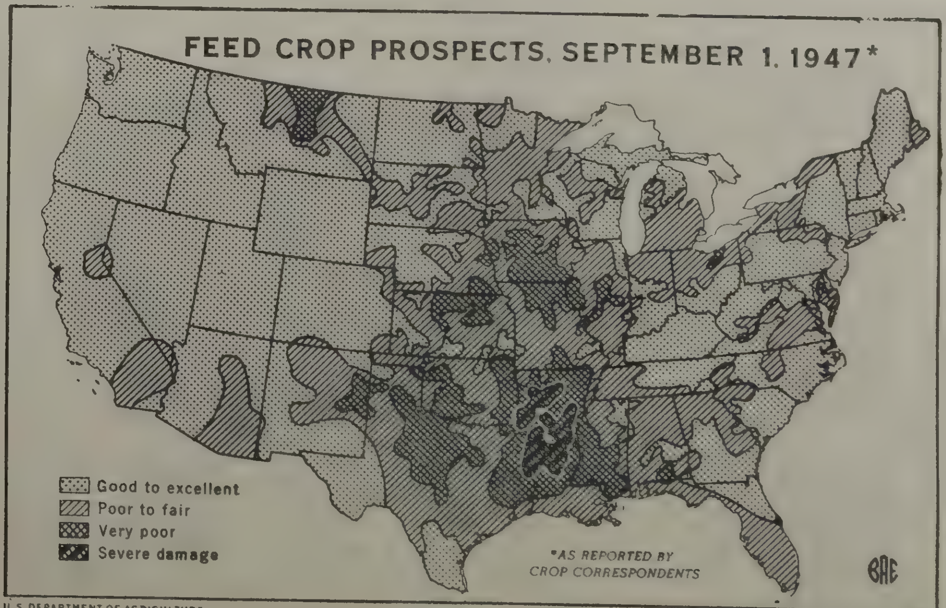
FEED CROPS


FEED CROP PROSPECTS, SEPTEMBER 1, 1948*
PERCENT OF NORMAL
80 and over ▨ Good to excellent
65 to 80 ▨ Poor to fair
50 to 65 ▨ Very poor
35 to 50 ▨ Severe drought
*AS REPORTED BY CROP CORRESPONDENTS
BAE

U.S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

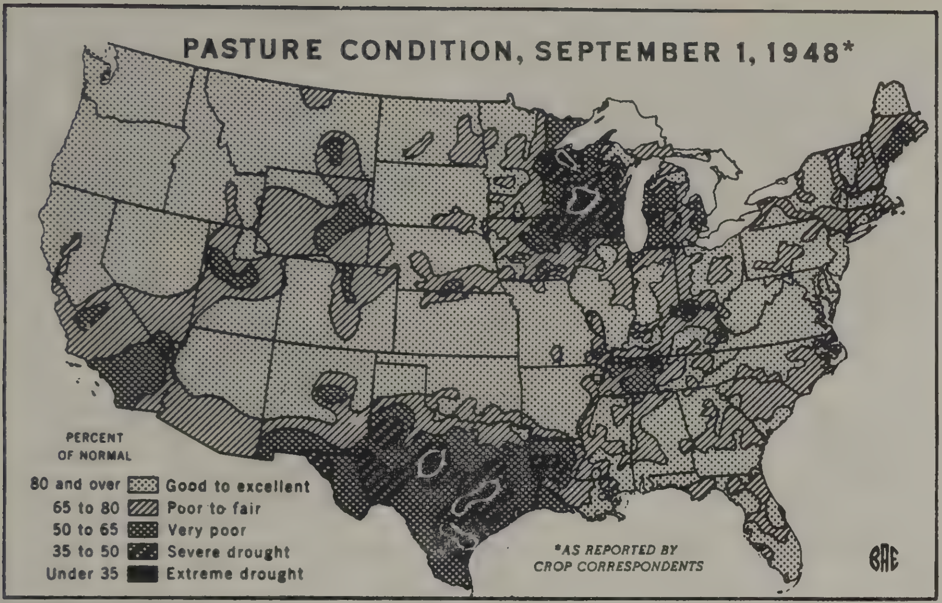
The all-time high in crop production is now assured for this year. The heat wave the last of August caused some crop damage, but over the country as a whole did more good than harm.

Feed crop prospects are above average, except in Louisiana, Texas, Wisconsin, Wyoming and New Mexico. Livestock numbers will probably have to be reduced in some range areas due to a shortage of hay. Some dairy sections of Wisconsin, Minnesota, Iowa and Illinois will have to ship in hay.


FEED CROP PROSPECTS, SEPTEMBER 1, 1947*
▨ Good to excellent
▨ Poor to fair
▨ Very poor
▨ Severe damage
*AS REPORTED BY CROP CORRESPONDENTS
BAE

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMI

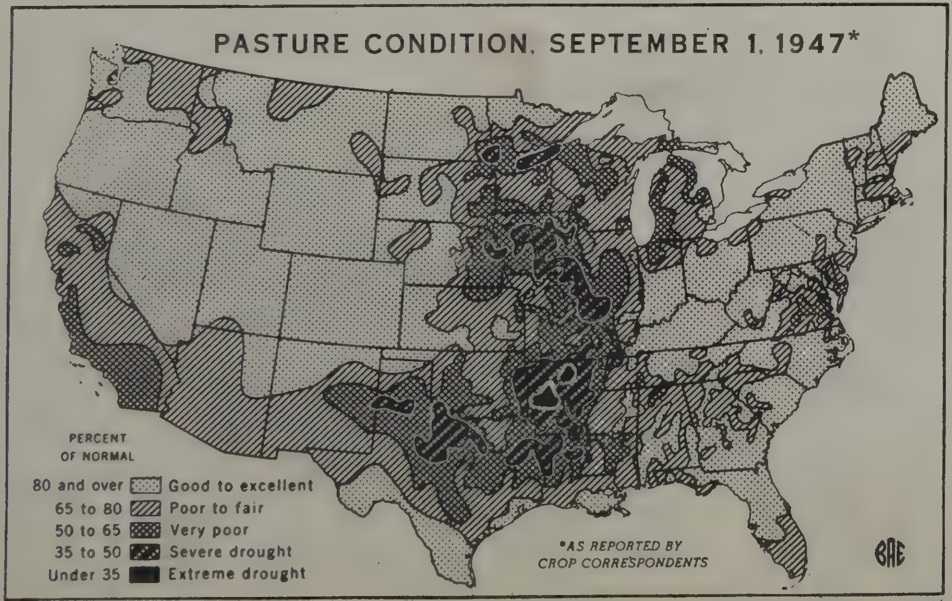
PASTURE CONDITIONS


PASTURE CONDITION, SEPTEMBER 1, 1948*
PERCENT OF NORMAL
80 and over ░ Good to excellent
65 to 80 ▨ Poor to fair
50 to 65 ▩ Very poor
35 to 50 ▦ Severe drought
Under 35 ■ Extreme drought
*AS REPORTED BY CROP CORRESPONDENTS
BAE

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

Pastures have generally improved and are in better shape than they were this time last year. Grazing conditions are much better along the Central Atlantic seacoast, in the Plains States and in the Pacific Northwest.

Poor pasturage is found in the western Great Lakes area, in the lower Tennessee Valley, in Louisiana and Texas, and in parts of Wyoming, New Mexico, Nevada and southern California. Fall and winter range prospects are good except in Wyoming, Texas, and scattered sections of the Mountain States.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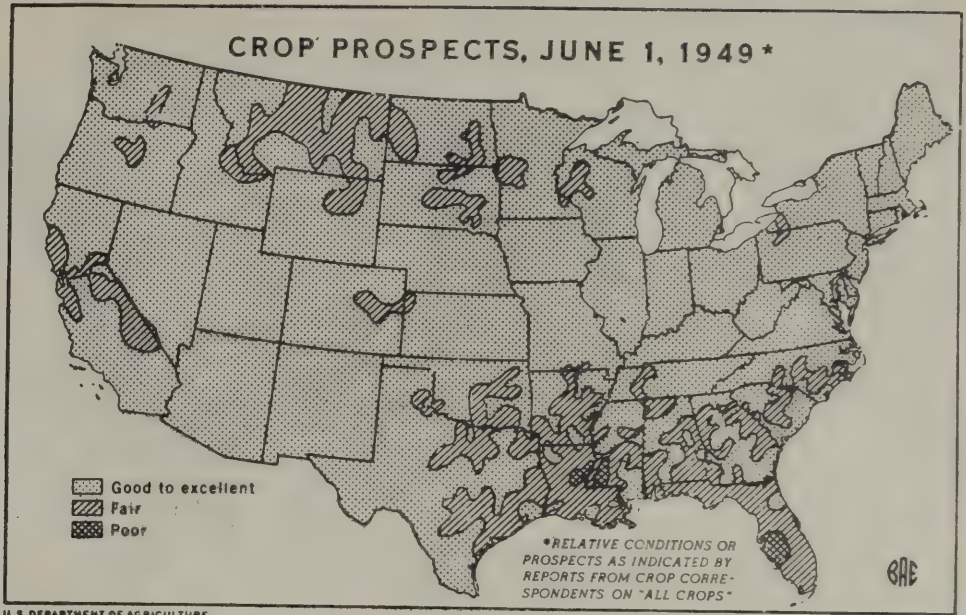
PERCENT OF NORMAL
80 and over ░ Good to excellent
65 to 80 ▨ Poor to fair
50 to 65 ▩ Very poor
35 to 50 ▦ Severe drought
Under 35 ■ Extreme drought
*AS REPORTED BY CROP CORRESPONDENTS
BAE

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

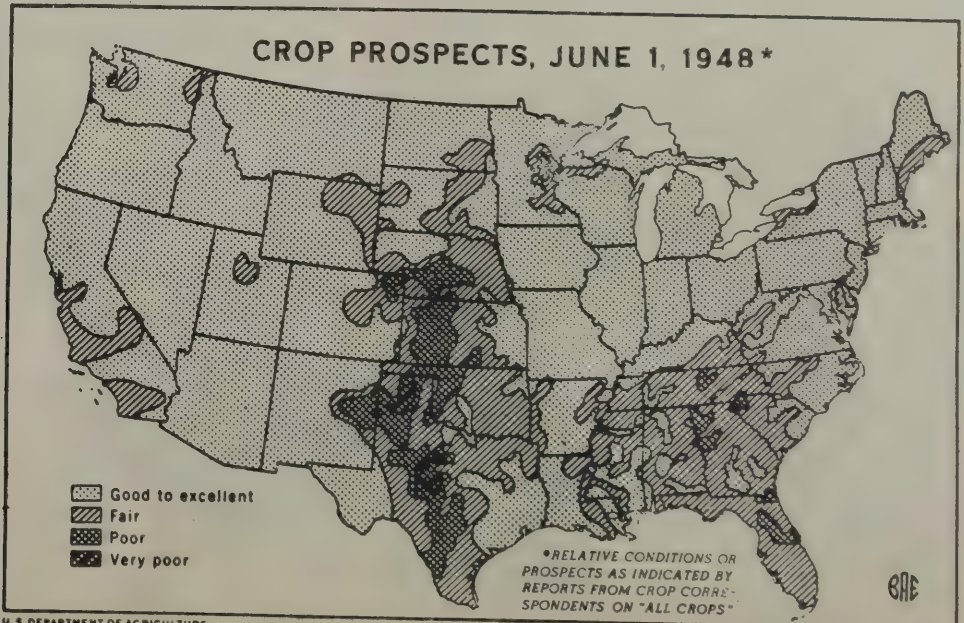
CROP CONDITIONS


CROP PROSPECTS, JUNE 1, 1949*
▨ Good to excellent
▨ Fair
▨ Poor
*RELATIVE CONDITIONS OR PROSPECTS AS INDICATED BY REPORTS FROM CROP CORRESPONDENTS ON "ALL CROPS"
BAE

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

Crop prospects on June 1 were rather uniformly good and were considerably better than the same time a year ago. Reports from the farmer reporters were the most optimistic in 12 years. In only Florida and Louisiana were prospects far below the uniformly good level.

A relatively large total output of crops in 1949 is indicated by the estimate of the few major crops available at this time. Winter wheat, harvest of which is just getting well started, is expected to run a close second to the record 1947 crop.


CROP PROSPECTS, JUNE 1, 1948*
▨ Good to excellent
▨ Fair
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▨ Very poor
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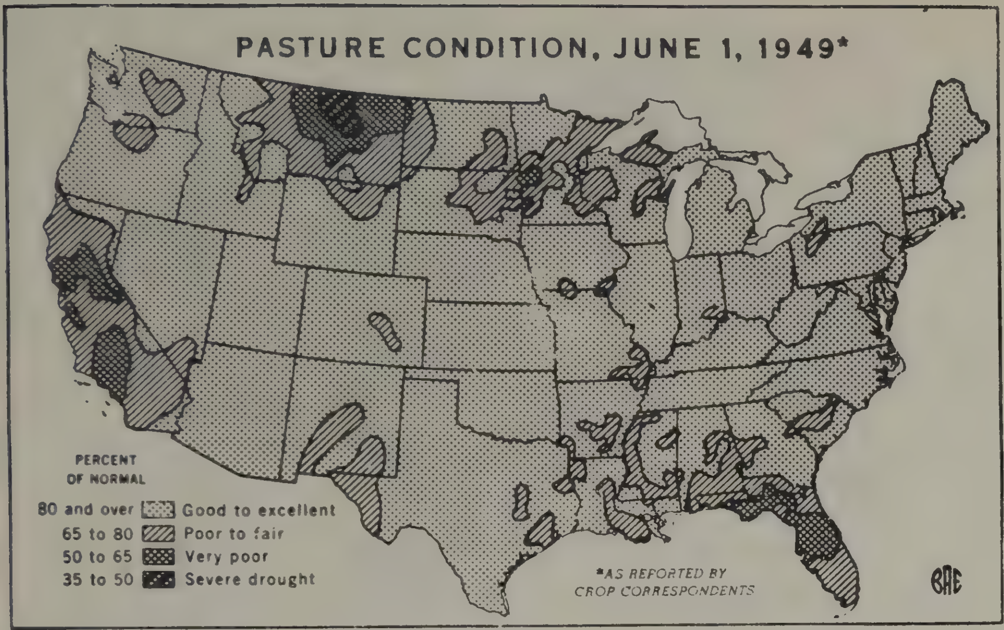
BAE

U S DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

PASTURE CONDITIONS



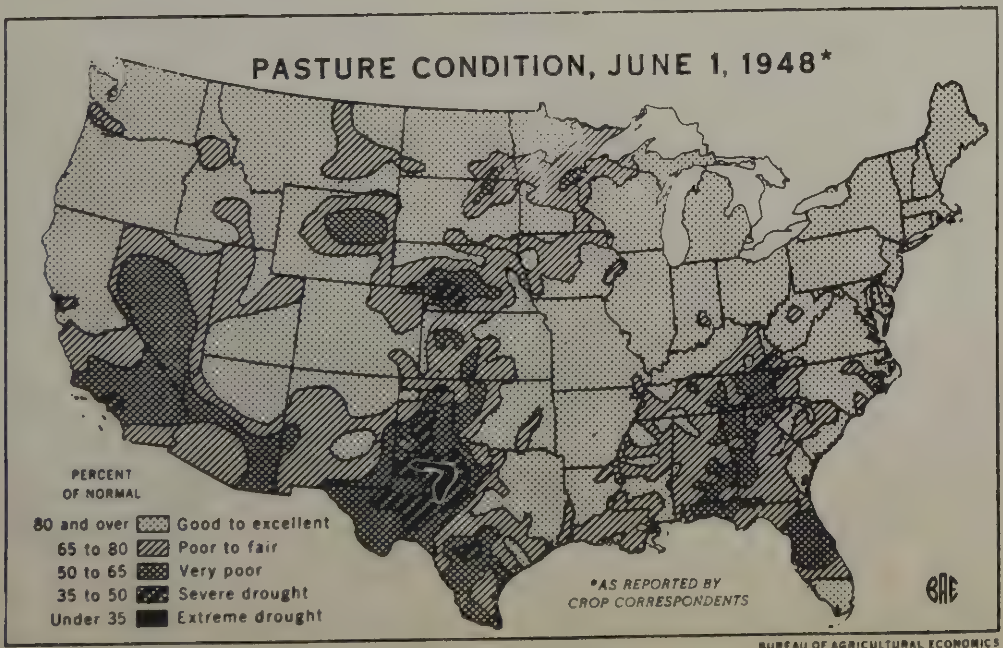
PASTURE CONDITION, JUNE 1, 1949*

*AS REPORTED BY CROP CORRESPONDENTS

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Farm pastures on June 1 were among the best of recent years and are furnishing an abundance of green feed for livestock in nearly all parts of the country. Reserves of grass in excess of current needs are generally available and prospects for early summer pasture feed are good except for spotted areas.

In the central Great Plains, pastures and ranges are furnishing exceptionally good feed for livestock this year. In Kansas and Oklahoma, June 1 pasture condition was the highest reported since 1922 and in Nebraska the highest in 30 years.



PASTURE CONDITION, JUNE 1, 1948*

PERCENT
OF NORMAL
80 and over ⛆ Good to excellent
65 to 80 ▨ Poor to fair
50 to 65 ▩ Very poor
35 to 50 ▦ Severe drought
Under 35 ■ Extreme drought
BAE

*AS REPORTED BY CROP CORRESPONDENTS

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

1953 CROP SUMMARY

	ACREAGE HARVESTED (in thousands)			PRODUCTION (in thousands)				YIELD PER ACRE		
	Average 1942-51	1952	1953	Unit	Average 1942-51	1952	1953	Average 1942-51	1952	1953
Corn, all...........	86,447	81,099	80,279	Bushels	3,036,380	3,279,403	3,176,615	35.2	40.4	39.6
Wheat, all..........	63,910	70,926	67,608	"	1,088,548	1,298,957	1,168,536	17.1	18.3	17.3
Winter............	45,249	50,692	46,681	"	797,237	1,059,558	877,511	17.6	20.9	18.8
All spring........	18,661	20,234	20,927	"	291,311	239,399	291,025	15.8	11.8	13.9
Durum...........	2,579	2,174	1,865	"	37,360	22,493	12,967	14.8	10.3	7.0
Other spring....	16,082	18,060	19,062	"	253,952	216,906	278,058	16.0	12.0	14.6
Oats................	39,503	38,422	39,358	"	1,324,614	1,260,127	1,216,416	33.5	32.8	30.9
Barley..............	11,831	8,244	8,534	"	295,299	226,014	241,015	25.1	27.4	28.2
Rye.................	2,108	1,383	1,382	"	25,837	16,046	17,998	12.2	11.6	13.0
Buckwheat...........	373	161	175	"	6,370	3,205	3,193	17.2	19.9	18.2
Flaxseed............	4,107	3,303	4,380	"	38,312	30,174	36,813	9.3	9.1	8.4
Rice................	1,645	1,965	2,135	Bags 1/	35,120	48,107	52,529	21.3	24.5	24.6
Popcorn.............	146	171	192	Pounds	221,615	268,134	308,428	1,527	1,572	1,609
Sorghums for grain..	7,347	5,061	6,137	Bushels	137,263	83,024	109,022	18.4	16.4	17.8
Sorghums for forage.	5,909	4,925	5,241	Tons 2/	8,500	4,358	6,170	1.44	.88	1.18
Sorghums for silage.	723	708	978	Tons 3/	4,540	3,821	5,906	6.31	5.40	6.04
Cotton, lint........	21,489	25,841	24,434	Bales	12,216	15,139	16,437	271.4	280.8	322.4
Cottonseed..........	---	---	---	Tons	4,955	6,190	6,718	---	---	---
Hay, all............	74,666	74,454	73,918	Tons	102,296	104,345	105,300	1.37	1.40	1.42
Hay, wild...........	14,380	14,416	14,819	Tons	12,627	10,827	12,216	.88	.75	.82
Alfalfa seed........	900	1,340	942	Pounds	82,007	180,326	133,226	91	135	141
Red clover seed.....	1,836	1,705	1,412	"	92,267	98,707	83,237	51	58	59
Alsike clover seed..	115	71	64	"	14,400	13,217	12,432	126	187	193
Sweet clover seed...	285	272	235	"	42,140	43,760	35,585	146	161	152
Lespedeza seed......	883	678	444	"	172,304	126,905	63,667	194	187	143
Timothy seed........	358	242	196	"	53,979	31,790	24,695	148	131	126
Beans, dry edible...	1,791	1,261	1,398	Bags 4/	17,876	16,235	18,114	10.1	12.9	13.0
Peas, dry field.....	471	211	262	Bags 4/	5,998	2,610	3,350	12.6	12.4	12.8
Soybeans for beans..	11,114	14,338	14,366	Bushels	219,596	298,052	262,341	19.7	20.8	18.3
Cowpeas for peas....	621	291	318	"	3,582	1,703	1,964	5.9	5.9	6.2
Peanuts picked and threshed..........	2,951	1,464	1,538	Pounds	2,062,522	1,371,600	1,574,250	714	937	1,024
Velvetbeans 5/......	1,035	484	311	Tons	426	159	128	.42	.33	.41
Potatoes............	2,265	1,402	1,508	Bushels	411,007	349,098	373,711	191.2	249.0	247.8
Sweet potatoes......	583	325	350	"	54,331	28,532	33,974	93.6	87.8	97.2
Tobacco.............	1,677	1,772	1,638	Pounds	1,948,844	2,254,512	2,046,037	1,158	1,273	1,249
Sorgo sirup.........	128	41	41	Gallons	7,991	2,595	2,739	63.2	63.3	66.8
Sugar cane for sugar and seed..........	316	339	346	Tons	6,281	7,605	7,957	19.9	22.5	23.0
Sugar cane sirup....	91	29	27	Gallons	16,573	6,005	5,650	181	207	209
Sugar beets.........	745	665	747	Tons	10,027	10,169	12,029	13.4	15.3	16.1
Maple sugar.........	6/8,505	6/7,056	6/6,675	Pounds	340	159	126	7/1.84	7/1.90	7/1.52
Maple sirup.........	6/8,505	6/7,056	6/6,675	Gallons	1,939	1,654	1,254	7/1.84	7/1.90	7/1.52
Broomcorn...........	265	258	251	Tons	40	31	30	.15	.12	.12
Hops................	38	38	28	Pounds	51,075	61,263	41,803	1,327	1,600	1,488
Apples, commercial crop.............	---	---	---	Bushels	8/109,224	8/92,489	8/92,584	---	---	---
Peaches, total......	---	---	---	"	8/67,012	8/62,560	8/64,102	---	---	---
Pears, total........	---	---	---	"	8/30,396	8/30,947	8/29,065	---	---	---
Grapes, total.......	---	---	---	Tons	8/2,874	3,164	2,641	---	---	---
Cherries(12 States).	---	---	---	"	8/198	8/218	225	---	---	---
Apricots(3 States)..	---	---	---	"	8/226	8/177	240	---	---	---
Plums (2 States)....	---	---	---	"	8/87	8/61	8/92	---	---	---
Prunes, dried (3 States)........	---	---	---	"	8/188	137	146	---	---	---
Prunes, other than dried (3 States)..	---	---	---	"	8/97	8/78	8/79	---	---	---
Avocados (2 States).	---	---	---	"	23	32	35	---	---	---
Olives (California).	---	---	---	"	47	57	30	---	---	---
Oranges (5 States)..	---	---	---	Boxes	110,350	124,580	124,885	---	---	---
Grapefruit(4 States)	---	---	---	"	51,246	38,360	43,160	---	---	---
Lemons (California).	---	---	---	"	12,722	12,590	13,000	---	---	---
Cranberries (5 States)........	26	28	28	Barrels	8/788	804	1,230	29.9	29.0	44.2
Pecans..............	---	---	---	Pounds	126,518	147,946	173,065	---	---	---
Almonds (California)	---	---	---	Tons	36	36	36	---	---	---
Walnuts (2 States)..	---	---	---	"	8/71	84	58	---	---	---
Tung nuts(5 States).	---	---	---	"	43	132	145	---	---	---
Commercial vegetables........										
For fresh market (28 crops)....	9/2,092	2,016	2,131	Tons	8/9/9,436	9,496	10,098	---	---	---
For processing (11 crops)....	1,863	1,815	1,798	"	5,662	6,664	6,545	---	---	---
Total 59 crops 10/	344,909	341,846	340,444	---	---	---	---	---	---	---

1/ Bags of 100 pounds.
2/ Dry weight.
3/ Green weight.
4/ Bags of 100 pounds (uncleaned).
5/ All purposes.
6/ 1,000 trees tapped.
7/ Total equivalent sugar per tree.
8/ Includes some quantities not harvested.
9/ Average 1949-1951.
10/ Excluding crops not harvested, minor crops, duplicated seed acreages, strawberries, and other fruits.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
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1953 CROP SUMMARY

State	CORN		ALL WHEAT (Bushels)		OATS (Bushels)		SOYBEANS (Bushels)		COTTON LINT (Pounds)		ALL HAY (Tons)	
	Average 1942-51	1953	Average 1942-51	1953	Average 1942-51	1953	Average 1942-51	1953	Average 1942-51	1953	Average 1942-51	1953
Maine	37.9	39.0	--	--	40.1	45.0	--	--	--	--	1.00	1.04
N. H.	43.3	43.0	--	--	35.9	37.0	--	--	--	--	1.19	1.22
Vt.	42.2	42.0	--	--	33.1	32.0	--	--	--	--	1.40	1.34
Mass.	43.8	46.0	--	--	31.6	39.0	--	--	--	--	1.56	1.48
R. I.	40.5	45.0	--	--	31.3	33.0	--	--	--	--	1.47	1.78
Conn.	43.8	45.0	--	--	32.2	31.0	--	--	--	--	1.58	1.63
N. Y.	38.8	44.0	25.4	29.5	34.2	39.0	16.1	16.0	--	--	1.57	1.69
N. J.	44.3	54.5	23.0	25.0	31.7	37.0	17.3	18.0	--	--	1.71	1.81
Pa.	43.2	42.0	21.2	24.0	32.2	37.0	16.0	17.0	--	--	1.48	1.57
Ohio	50.0	55.0	22.6	29.0	36.9	42.0	20.2	20.5	--	--	1.46	1.55
Ind.	49.9	51.5	19.7	28.0	34.7	36.5	20.3	21.0	--	--	1.40	1.43
Ill.	51.2	54.0	18.9	27.0	39.2	37.0	22.4	20.5	--	--	1.50	1.58
Mich.	36.8	45.5	24.7	29.5	37.0	35.0	17.8	19.0	--	--	1.40	1.50
Wisc.	44.0	58.5	23.0	23.1	44.5	41.5	13.4	14.5	--	--	1.72	1.97
Minn.	41.6	48.0	17.8	16.2	38.3	31.5	15.7	20.5	--	--	1.50	1.86
Iowa	49.9	53.0	19.3	19.9	36.9	26.0	20.4	21.5	--	--	1.63	1.68
Mo.	35.0	33.5	16.3	26.0	24.3	25.5	17.7	14.0	379	383	1.22	.99
N. D.	21.8	22.5	15.0	10.3	29.4	31.0	11.2	13.5	--	--	.95	1.09
S. D.	26.9	34.5	13.0	9.2	31.6	25.5	14.3	18.0	--	--	.86	1.03
Nebr.	29.6	28.0	19.4	22.3	27.0	18.5	19.0	18.5	--	--	1.08	.98
Kans.	25.6	21.5	15.7	12.5	22.1	21.5	12.6	8.0	--	--	1.61	1.20
Del.	31.9	39.0	18.8	19.5	30.5	34.0	13.2	16.5	--	--	1.39	1.48
Md.	39.5	45.0	19.3	20.5	31.7	34.0	14.5	19.0	--	--	1.39	1.46
Va.	35.6	27.0	17.6	21.0	28.5	32.5	16.1	16.0	358	288	1.16	1.09
W. Va.	37.5	37.0	17.9	22.0	27.7	28.5	14.2	--	--	--	1.24	1.17
N. C.	27.4	27.0	16.1	20.5	28.5	38.5	13.4	14.5	345	280	1.01	.98
S. C.	18.4	19.5	14.6	18.0	25.3	32.0	9.6	11.0	314	283	.81	.81
Ga.	14.0	20.0	13.3	18.5	24.6	33.0	8.8	12.0	252	265	.55	.74
Fla.	11.8	16.5	--	--	18.3	30.0	--	18.0	193	171	.58	.80
Ky.	33.7	35.5	15.3	22.0	23.1	30.5	16.6	13.0	--	--	1.29	1.13
Tenn.	28.3	29.5	14.0	19.0	25.6	32.0	16.7	13.5	364	355	1.15	1.06
Ala.	17.1	22.0	15.6	22.0	24.1	32.0	15.4	20.5	285	287	.75	.87
Miss.	18.8	22.0	21.6	26.5	28.8	40.0	15.2	12.0	337	413	1.16	1.06
Ark.	19.8	17.0	13.7	19.0	27.4	35.0	16.9	11.0	334	359	1.12	.86
La.	17.6	20.0	--	--	26.6	32.0	14.0	16.0	314	419	1.21	1.26
Okla.	18.8	14.0	13.0	12.0	18.7	21.5	9.7	10.0	160	211	1.24	1.22
Tex.	16.8	16.5	12.3	8.5	20.1	27.0	--	--	183	232	.97	1.16
Mont.	15.8	20.0	17.3	18.9	33.5	34.0	--	--	--	--	1.15	1.18
Idaho	48.0	55.0	27.1	28.6	41.9	42.0	--	--	--	--	2.13	2.46
Wyo.	16.4	21.0	19.0	16.5	30.8	28.5	--	--	--	--	1.11	1.20
Colo.	21.9	33.0	18.8	15.7	30.3	29.5	--	--	--	--	1.58	1.72
N.Mex.	14.6	15.0	10.3	6.2	21.5	21.0	--	--	485	505	2.09	2.09
Ariz.	12.3	15.0	23.2	26.0	37.4	53.0	--	--	522	700	2.37	2.75
Utah	32.6	41.0	22.3	20.6	43.9	47.0	--	--	--	--	2.02	2.23
Nev.	32.3	40.0	28.1	27.5	40.6	43.0	--	--	--	--	1.47	1.59
Wash.	50.3	60.0	26.6	28.6	46.3	50.0	--	--	--	--	1.89	2.02
Ore.	38.3	45.0	25.7	28.1	28.8	30.7	--	--	--	--	1.69	1.78
Calif.	32.9	36.0	18.5	19.0	29.5	31.0	--	--	615	601	2.99	3.13
U. S.	35.2	39.6	17.1	17.3	33.5	30.9	19.7	18.3	271	322	1.37	1.42

With harvest completed, this year's volume of crops is almost equal to the second-largest total produced in 1952. This was done in spite of a severe drouth over much of the country. The harvested acreage of crops this year totaled nearly 340½ million acres -- less than in 1952 or any of the 7 years, 1943-1949. Total crop production was nearly a third larger than in the 1923-1932 base period.

Over 359 million acres of the 59 principal crops were planted or grown in 1953. This was 3.1 million acres more than last year and slightly more than average. Part of the increase was the sizable abandoned acreage of winter wheat replanted to sorghums or other crops.

Losses of acreage -- the difference between planted and harvested totals -- were nearly 18.7 million acres. This is 4.5 million acres more than in 1952. With the exception of the 26 million acreage loss in 1951, it was the largest since 1939. Most of this was winter wheat, over 10 million acres this year.

Feed grain tonnage harvested in 1953 is relatively small. The 117 million tons produced is 2.5 million less than in 1952. The 105.3 million tons of mostly good quality hay is a million tons more than was put up in 1952 and 3 million above average. Oilseed production for 1953 is among the largest of record. The 16.4 million tons produced is 1.5 percent less than the 1952 record tonnage, but 1/5 above average.

A record 10.1 million tons of the 28 vegetables grown commercially for fresh market were produced in the 1953 season -- 6 percent more than last year and 7 percent above average. For processing, about 6.55 million tons of the 11 vegetables were produced -- 2 percent less than in 1952, but 16 percent above average.

Nearly 8.2 million tons of the major deciduous fruits were produced in 1953 -- 5 percent less than in 1952 and 9 percent below average. The 1953-54 citrus total is expected to reach 7.6 million tons, more than either last year or average.

1952 CROP SUMMARY

CROP REPORTING BOARD —— UNITED STATES DEPARTMENT OF AGRICULTURE

	ACREAGE HARVESTED (in thousands)			PRODUCTION (in thousands)				YIELD PER ACRE			PRICES		
	Average 1941-50	1951	1952	Unit	Average 1941-50	1951	1952	Average 1941-50	1951	1952	[illegible]	1951	[illegible] 1952
Corn, all..........	86,909	[illegible]	[illegible]	Bushels	[illegible]	[illegible]	[illegible]	34.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wheat, all.........	63,354	61,492	[illegible]	"	[illegible]	[illegible]	[illegible]	17.2	16.0	[illegible]	[illegible]	[illegible]	[illegible]
Winter...........	45,245	39,823	50,348	"	[illegible]	[illegible]	[illegible]	17.7	16.2	[illegible]	-	--	- -
All Spring.......	18,110	21,669	20,237	"	[illegible]	[illegible]	[illegible]	[illegible]	15.4	[illegible]	---	--	
Durum............	2,579	2,518	2,153	"	[illegible]	[illegible]	[illegible]	[illegible]	13.8	[illegible]	-	-	
Other Spring.....	15,530	19,151	18,084	"	[illegible]	[illegible]	[illegible]	[illegible]	15.7	[illegible]	- -		
Oats.............	39,667	36,525	38,643	"	[illegible]	[illegible]	[illegible]	33.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Barley............	12,315	9,436	8,264	"	[illegible]	[illegible]	[illegible]	24.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rye...............	2,294	1,710	1,355	"	[illegible]	[illegible]	[illegible]	[illegible]	12.5	[illegible]	[illegible]	[illegible]	[illegible]
Buckwheat.........	387	201	161	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		-	
Flaxseed..........	4,043	3,904	3,309	"	[illegible]	[illegible]	[illegible]	9.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rice..............	1,569	1,967	1,972	Bags 1/	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Popcorn...........	142	135	166	Pounds	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			- -
Sorghums for grain.	7,100	8,487	[illegible]	Bushels	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sorghums for forage	6,491	4,660	[illegible]	Tons 2/	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	- -	
Sorghums for silage	766	802	[illegible]	Tons 3/	4,767	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	- -	
Cotton, Lint........	21,020	26,637	24,995	Bales	11,775	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cottonseed.........	- -	--	---	Tons	[illegible]	[illegible]	[illegible]	--	---	--	[illegible]	[illegible]	[illegible]
Hay, all...........	74,536	74,442	74,654	Tons	101,072	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hay, wild....... ...	14,168	14,382	14,621	Tons	12,539	12,145	[illegible]	[illegible]	[illegible]	75		-	-
Alfalfa seed.......	892	884	1,266	Pounds	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	- -
Red clover seed....	1,831	1,458	1,698	"	[illegible]	[illegible]	97,555	[illegible]	[illegible]	[illegible]	--	-	--
Alsike clover seed.	117	94	71	"	14,592	14,245	[illegible]	[illegible]	[illegible]	[illegible]	--	---	-
Sweet clover seed..	290	309	272	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	---	- -
Lespedeza seed.....	900	639	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	- -	- -
Timothy seed.......	366	294	248	"	55,344	[illegible]	[illegible]	[illegible]	[illegible]	134	--		
Beans, dry edible..	1,852	[illegible]	1,272	Bags 4/	17,997	[illegible]	16,777	[illegible]	[illegible]	13.2	[illegible]	[illegible]	[illegible]
Peas, dry field....	471	294	211	Bags 4/	[illegible]	[illegible]	[illegible]	12.7	[illegible]	12.4	[illegible]	[illegible]	[illegible]
Soybeans for beans.	10,349	13,545	14,075	Bushels	202,068	[illegible]	291,682	[illegible]	[illegible]	20.7	[illegible]	[illegible]	[illegible]
Cowpeas for peas...	736	[illegible]	292	"	4,186	[illegible]	[illegible]	[illegible]	[illegible]	5.9	---	---	-
Peanuts picked and threshed	2,940	2,009	1,513	Pounds	2,042,448	[illegible]	1,365,000	[illegible]	[illegible]	902	[illegible]	[illegible]	- - -
Velvetbeans 5/.....	[illegible]	624	484	Tons	495	242	159	[illegible]	[illegible]	[illegible]	--	--	--
Potatoes...........	2,401	1,334	1,398	Bushels	[illegible]	[illegible]	347,504	[illegible]	[illegible]	[illegible]	.717	[illegible]	[illegible]
Sweet Potatoes	625	314	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tobacco............	1,630	1,783	1,776	Pounds	[illegible]	[illegible]	2,207,477	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sorgo sirup........	141	45	41	Gallons	8,765	[illegible]	2,595	[illegible]	[illegible]	[illegible]	---	- -	-
Sugarcane for sugar and seed.........	313	319	331	Tons	[illegible]	6,118	[illegible]	[illegible]	[illegible]	[illegible]	---	---	
Sugarcane sirup....	99	33	30	Gallons	17,833	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	---	-
Sugar beets........	751	691	667	Tons	10,013	10,485	[illegible]	13.2	15.2	15.3	- -	--	-
Maple sugar........	6/8,785	6/7,412	6/6,958	Pounds	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	---	--
Maple sirup........	5/8,785	5/7,412	5/6,958	Gallons	1,977	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	---	--
Broomcorn..........	264	262	249	Tons	41	34	[illegible]	[illegible]	257	[illegible]	--	- -	-
Hops...............	38	41	38	Pounds	48,789	63,239	[illegible]	[illegible]	1,535	[illegible]	--	-	- -
Apples, commercial crop............	--	--	---	Bushels	[illegible]	[illegible]	[illegible]	--	---	--	[illegible]	[illegible]	[illegible]
Peaches, total.....	--	---	---	"	[illegible]	[illegible]	[illegible]	-	---	--	-	- -	--
Pears, total.......	--	--	---	"	[illegible]	[illegible]	[illegible]	---	-	--	---	--	
Grapes, total......	---	---	---	Tons	[illegible]	[illegible]	[illegible]	--	---	--	--	---	- -
Cherries(12 States)	---	---	---	"	7/ 191	[illegible]	[illegible]	-	---	---	---	-	- -
Apricots(3 States).	---	--	---	"	7/ 229	[illegible]	[illegible]	---	---	---	---	---	- -
Plums (2 States)...	---	---	--	"	7/ 84	[illegible]	[illegible]	--	---	---	---	---	
Prunes, dried (3 States).......	--	---	---	"	7/ 189	[illegible]	[illegible]	--	---	---	--	---	---
Prunes, other than dried (3 States).	---	---	---	"	7/ 97	[illegible]	[illegible]	---	--	-	- -	- -	- -
Oranges (5 States).	---	---	---	Boxes	106,607	[illegible]	[illegible]	---	---	---	[illegible]	1.01	[illegible]
Grapefruit (4 States).......	---	---	-	"	51,222	[illegible]	[illegible]	---	---	---	[illegible]	[illegible]	[illegible]
Lemons (California)	---	---	---	"	12,614	12,800	13,100	---	---	---	[illegible]	1.97	[illegible]
Cranberries (5 States).......	26	27	28	Barrels	7/ 770	910	[illegible]	29.5	33.2	28.9	---	---	---
Pecans.............	---	---	---	Pounds	123,206	154,895	[illegible]	---	---	---	---	---	---
Tung nuts (5 States).......	---	---	---	Tons	39	49	[illegible]	---	---	---	---	---	---
Commercial truck crops............	---	3,840	3,809	---	---	---	---	---	---	---	---	---	---
For market (27 crops)...	---	1,972	2,002	---	---	---	---	---	---	---	---	---	---
For processing (11 crops)...	1,841	1,868	1,807	---	---	---	---	---	---	---	---	---	---
Total 52 crops 9/..	344,697	335,791	340,935	---	---	---	---	---	---	---	---	---	---

1/ Bags of 100 pounds.
2/ Dry weight.
3/ Green weight.
4/ Bags of 100 pounds (uncleaned).
5/ All purposes.
6/ 1,000 trees tapped.
7/ Includes some quantities not harvested.
9/ Excluding crops not harvested, minor crops, duplicated seed acreages, strawberries, and other fruits.
8/ Total equivalent sugar per tree.

The above table gives a detailed summary of the 1952 acreage, production and yield per acre of all crops for which information is reported. Prices are also given where available.

CROP PRODUCTION was the second largest in history, despite the drouth over a large part of the country. Crop acreage harvested was smaller than average, but yields were generally high.

RECORD YIELDS per acre were obtained for winter wheat, buckwheat, rice, dry beans, peanuts, sugar beets and hops. The composite yield index is 150 per cent of the 1923-32 base. This tops all other years except 1948 when the index was 155 per cent.

Production of rice and oranges reached a new high. The index of all crop volume at 132 per cent exceeded that of any other year except 1948 when the index reached 136 per cent.

A total of nearly 355 million acres was planted in the 53 principal crops. This was about 7 million acres less than 1951 and the third smallest acreage in the last ten years.

ACREAGE HARVESTED was nearly 341 million in 1952. This is 5 million acres more than in 1951, but less than in any of the 7 years from 1943 to 1949. The largest increase over 1941 was in the acreage of winter wheat harvested — with small increases in oats, corn and soybeans.

LOSSES in acreage — the difference between planted and harvested totals — were nearly 13.8 million acres. This is a little more than half the total acreage loss last year. A large part of the loss was, as usual, due to abandonment of winter

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1952 YIELD SUMMARY MAJOR CROPS

State	CORN (Bushels)		ALL WHEAT (Bushels)		OATS (Bushels)		SOYBEANS (Bushels)		COTTON LINT (Pounds)		ALL HAY (Tons)	
	Average 1941-50	1952	Average 1941-50	1952	Average 1941-50	1952	Average 1941-50	1952	Average 1941-50	1952	Average 1941-50	1952
Maine	38.3	31.0	--	--	39.4	30.0	--	--	--	--	0.97	1.17
N. H.	43.3	41.0	--	--	36.1	36.0	--	--	--	--	1.16	1.28
Vt.	42.0	42.0	--	--	32.2	36.0	--	--	--	--	1.37	1.44
Mass.	43.2	46.0	--	--	30.8	31.0	--	--	--	--	1.53	1.56
R. I.	40.3	44.0	--	--	31.3	31.0	--	--	--	--	1.42	1.68
Conn.	43.5	40.0	--	--	32.8	30.0	--	--	--	--	1.55	1.75
N. Y.	38.4	47.0	25.2	29.0	32.4	37.0	15.8	17.5	--	--	1.51	1.66
N. J.	43.0	52.5	22.6	25.0	31.3	33.0	16.9	20.5	--	--	1.68	1.83
Pa.	42.7	49.0	20.9	22.5	31.4	29.0	15.8	19.0	--	--	1.45	1.49
Ohio	50.2	53.0	23.3	24.5	37.1	37.0	20.3	22.0	--	--	1.44	1.47
Ind.	49.1	50.0	20.4	24.0	35.1	35.5	19.8	23.5	--	--	1.38	1.40
Ill.	51.5	58.0	19.0	23.0	39.5	37.0	22.0	24.0	--	--	1.46	1.63
Mich.	35.9	50.0	24.4	25.5	36.4	33.5	17.4	19.0	--	--	1.37	1.44
Wisc.	43.7	58.0	22.4	24.5	42.8	45.0	13.5	17.0	--	--	1.67	2.10
Minn.	41.9	50.5	17.3	14.7	36.7	39.0	15.4	19.0	--	--	1.47	1.83
Iowa	50.6	64.0	19.6	22.0	36.8	35.0	20.1	25.5	--	--	1.60	1.82
Mo.	34.5	41.0	15.9	22.0	24.6	22.0	16.8	19.0	406	400	1.20	1.08
N. D.	22.0	19.5	15.4	10.1	29.6	23.0	1/11.0	12.5	--	--	.96	.86
S. D.	26.5	28.0	12.7	8.2	30.5	26.5	14.0	15.0	--	--	.84	.78
Nebr.	29.3	37.0	19.5	22.4	27.2	19.0	17.8	26.0	--	--	1.06	1.12
Kans.	25.5	22.0	15.9	21.0	22.7	20.5	12.3	11.5	--	--	1.61	1.18
Del.	31.0	38.0	18.8	21.0	30.4	31.0	12.8	17.0	--	--	1.37	1.46
Md.	38.5	46.0	19.4	20.5	31.3	34.5	14.1	18.0	--	--	1.36	1.46
Va.	34.0	33.0	17.0	21.5	27.7	33.0	15.6	17.0	364	480	1.14	1.21
W. Va.	35.8	41.0	17.7	21.0	27.0	29.5	14.1	15.0	--	--	1.22	1.21
N. C.	26.5	25.5	15.4	21.0	27.6	34.0	12.8	16.5	341	380	1.01	1.08
S. C.	17.8	15.0	13.9	20.0	24.8	30.0	9.2	11.5	293	292	.80	.86
Ga.	13.4	12.0	12.6	19.0	24.1	30.0	8.4	10.5	236	249	.54	.66
Fla.	11.2	15.5	--	--	17.2	30.0	--	20.0	180	277	.56	.69
Ky.	32.8	28.0	15.6	20.0	22.8	25.0	16.2	15.5	--	--	1.29	1.05
Tenn.	27.9	20.0	13.9	19.0	25.6	28.0	15.9	20.0	373	374	1.16	.88
Ala.	16.6	11.0	14.8	19.0	23.6	28.5	14.4	19.0	277	285	.75	.79
Miss.	18.3	16.0	21.8	26.0	29.5	37.0	15.0	13.5	333	380	1.18	.94
Ark.	19.3	15.0	13.2	18.0	27.2	32.5	16.4	16.0	339	337	1.12	.77
La.	16.6	19.0	--	--	26.8	35.0	13.4	14.5	290	405	1.22	1.18
Okla.	18.4	13.0	13.2	18.5	19.0	21.0	9.2	10.5	166	108	1.26	1.11
Tex.	16.5	18.5	12.4	11.5	21.1	25.5	--	--	183	175	.99	1.00
Mont.	16.2	14.0	17.5	14.4	33.4	33.5	--	--	--	--	1.17	1.07
Idaho	47.0	57.0	27.4	26.4	41.8	46.5	--	--	--	--	2.12	2.41
Wyo.	16.6	21.0	19.2	16.3	30.7	31.0	--	--	--	--	1.12	1.17
Colo.	20.9	26.5	19.2	17.6	30.7	33.0	--	--	--	--	1.58	1.73
N. Mex.	14.6	14.0	11.3	6.6	22.1	22.0	--	--	485	519	2.09	2.20
Ariz.	12.3	12.0	22.0	26.0	36.5	52.0	--	--	489	727	2.34	2.70
Utah	31.8	38.0	22.8	17.7	43.9	46.0	--	--	--	--	2.03	2.39
Nev.	31.1	42.0	27.8	25.2	40.8	44.0	--	--	--	--	1.48	1.71
Wash.	48.6	59.0	25.8	27.9	46.2	50.0	--	--	--	--	1.91	1.88
Ore.	37.4	44.0	25.8	28.0	29.1	33.8	--	--	--	--	1.73	1.74
Calif.	32.7	35.0	18.3	21.0	29.6	32.5	--	--	606	624	2.96	3.19
U.S.	34.7	40.6	17.2	18.3	33.0	32.8	19.4	20.7	268	288	1.36	1.40

1/ Short-time average

wheat but the loss from this crop was only one-third as much as in 1951. Loss of cotton acreage was among the largest of record.

FOOD GRAIN production (wheat, rice, rye and buckwheat) was exceeded only in 1947. About 121 million tons of feed grains were harvested in 1952, nearly 7 per cent more than in 1951 and fifth largest on record. This total is far short of the 1948 record. The total feed grain tonnage is adequate for 1952-53 feeding needs. It may permit an increase in corn carryover that will more than offset the probable decreases in carryover of the other three feed grains.

HAY supply is three per cent smaller than last year, but three per cent above average, and is generally of good to excellent quality. Much of the excess hay produced in the North Central areas has been moved to the South and Southwest to help improve supplies that were lowered by drouth and supplemental feeding.

OILSEEDS--A near record tonnage is available from 1952 crops, with a total of 16,409,000 tons. Soybeans account for over half of the total, and because of low moisture content may supply larger proportions of oil and meal than usual. Production of the other 3 oilseeds are all smaller than last year, although peanut yields set a new record.

Both yield and production of tobacco were above average. Sugar production from beets and cane is expected to be nearly 2.1 million tons, an increase over last year. Dry bean production was less than in 1951 and 7 per cent below average, with a record yield on a small acreage.

Sweetpotato production continued at a low level, less than half of average. Yields were limited by dry weather. Potato production increased because of larger acreage and near record yields. Production was 16 per cent below average.

FRUIT production, including deciduous and miscellaneous fruits and the 1952-53 citrus crop, totals nearly 16 million tons, 5 per cent less than in 1951 but slightly above average.

1950 CROP SUMMARY

AGRICULTURAL MARKETING SERVICE UNITED STATES DEPARTMENT OF AGRICULTURE

CROP	ACREAGE HARVESTED (in thousands)			PRODUCTION (in thousands)				YIELD PER ACRE			PRICES		
	Average 1939-48	1949	1950	Unit	Average 1939-48	1949	1950	Average 1939-48	1949	1950	5-yr.Av 1935-39	Nov.15 1949	Nov.15 1950
Corn, all..........	88,007	87,029	83,302	Bushels	2,900,932	3,379,436	3,131,009	32.9	38.8	37.6	$.691	$1.02	$1.37
Wheat, all.........	60,236	76,559	61,741	"	1,031,312	1,141,188	1,026,755	17.0	14.9	16.6	.837	1.90	1.94
Winter...........	42,895	55,129	43,816	"	758,821	895,101	750,666	17.5	16.2	17.1	---	---	---
All spring.......	17,340	21,430	17,925	"	272,491	246,087	276,089	15.7	11.5	15.4	---	---	---
Durum............	2,535	3,525	2,729	"	36,753	38,817	36,064	14.8	11.0	13.2	---	---	---
Other spring.....	14,805	17,905	15,196	"	235,738	207,270	240,025	15.9	11.6	15.8	---	---	---
Oats...............	38,762	40,440	42,027	"	1,274,474	1,329,473	1,465,134	32.8	32.9	34.9	.340	.664	.806
Barley.............	12,858	9,857	11,191	"	310,668	236,737	301,009	24.2	24.0	26.9	.533	1.10	1.14
Rye................	2,674	1,560	1,822	"	32,155	18,739	22,977	12.0	12.0	12.6	.554	1.25	1.32
Buckwheat..........	414	280	266	"	7,029	5,203	4,749	17.0	18.6	17.9	---	---	---
Flaxseed...........	3,643	4,924	3,893	"	34,752	43,946	39,263	9.5	8.9	10.1	1.69	3.57	3.14
Rice...............	1,428	1,840	1,608	Bags 1/	29,790	40,747	37,971	20.9	22.2	23.6	1.65	4.13	5.33
Popcorn............	129	99	141	Pounds	192,140	159,291	243,025	1,482	1,614	1,720	---	---	---
Sorghums for grain.	6,552	6,612	10,361	Bushels	108,836	152,630	237,456	16.4	23.1	22.9	1.17	1.66	1.77
Sorghums for forage	7,965	4,164	4,750	Tons 2/	11,317	6,541	7,360	1.42	1.57	1.55	---	---	---
Sorghums for silage	856	623	723	Tons 3/	5,017	4,414	5,415	5.85	7.09	7.49	---	---	---
Cotton, lint.......	21,282	27,230	17,850	Bales	11,599	16,128	9,884	261.3	284.0	265.4	.103	.277	.413
Cottonseed.........	---	---	---	Tons	4,730	6,559	4,005	---	---	---	27.52	42.30	98.40
Hay, all...........	74,470	72,995	75,741	Tons	100,344	99,536	106,819	1.35	1.36	1.41	11.20	21.50	21.20
Hay, wild..........	13,552	14,925	15,024	Tons	12,064	12,296	12,509	.89	.82	.83	---	---	---
Alfalfa seed.......	882	1,006	884	Bushels	1,304	1,997	1,879	1.48	1.99	2.12	---	---	---
Red clover seed....	1,767	1,235	2,537	"	1,645	1,319	2,638	.95	1.07	1.04	---	---	---
Alsike clover seed.	135	108	110	"	340	267	315	2.54	2.48	2.86	---	---	---
Sweet clover seed..	283	312	448	"	752	943	1,404	2.66	3.03	3.14	---	---	---
Lespedeza seed.....	847	1,005	741	Pounds	178,191	248,300	163,120	208	247	220	---	---	---
Timothy seed.......	375	278	461	Bushels	1,329	793	1,607	3.53	2.85	3.49	---	---	---
Beans, dry edible..	1,866	1,838	1,493	Bags 4/	17,367	21,377	16,843	932	1,163	1,128	3.52	6.58	7.35
Peas, dry field....	454	334	219	Bags 4/	5,800	3,256	2,979	1,246	975	1,360	1.40	3.13	3.01
Soybeans for beans.	8,764	10,156	13,291	Bushels	164,491	230,897	287,010	18.8	22.7	21.6	.954	1.95	2.54
Cowpeas for peas...	944	488	460	"	5,068	3,032	2,982	5.5	6.2	6.5	---	---	---
Peanuts picked and threshed.........	2,880	2,332	2,315	Pounds	1,950,690	1,875,825	2,038,425	687	804	881	.04	.10	.11
Velvetbeans 5/.....	1,648	778	934	Tons	660	337	413	807	866	884	---	---	---
Potatoes...........	2,654	1,913	1,847	Bushels	403,284	411,565	439,500	154.6	215.2	237.9	.717	1.34	.878
Sweetpotatoes......	683	551	563	"	61,786	55,368	58,729	90.8	100.5	104.4	.807	1.89	1.48
Tobacco............	1,650	1,631	1,594	Pounds	1,777,945	1,972,359	2,035,915	1,073	1,209	1,277	.168	.434	.525
Sorgo sirup........	177	90	101	Gallons	10,799	6,012	6,383	61.3	66.8	63.2	---	---	---
Sugarcane for sugar and seed.........	301	339	338	Tons	5,915	6,552	7,078	19.7	19.3	21.0	---	---	---
Sugarcane sirup....	115	70	62	Gallons	20,042	11,920	10,830	173	170	175	---	---	---
Sugar beets........	773	687	936	Tons	9,938	10,197	13,383	12.8	14.8	14.3	---	---	---
Maple sugar........	6/8,983	6/7,924	6/7,711	Pounds	413	292	262	9/1.88	9/1.67	9/2.08	---	---	---
Maple sirup........	6/8,983	6/7,924	6/7,711	Gallons	2,095	1,614	1,968	9/1.88	9/1.67	9/2.08	---	---	---
Broomcorn..........	263	247	186	Tons	41	45	26	311	362	279	---	---	---
Hops:..............	36	38	39	Pounds	7/45,816	7/50,796	7/58,336	1,252	1,353	1,504	---	---	---
Apples, commercial crop............	---	---	---	Bushels	7/109,408	7/133,742	7/120,499	---	---	---	.90	1.43	1.96
Peaches, total.....	---	---	---	"	7/70,090	7/74,818	7/52,573	---	---	---	---	---	---
Pears, total.......	---	---	---	"	7/30,295	7/36,404	31,263	---	---	---	---	---	---
Grapes, total......	---	---	---	Tons	7/2,777	2,662	7/2,641	---	---	---	---	---	---
Cherries(12 States)	---	---	---	"	7/179	7/250	242	---	---	---	---	---	---
Apricots(3 States).	---	---	---	"	7/234	7/198	202	---	---	---	---	---	---
Plums (2 States)...	---	---	---	"	7/81	7/96	83	---	---	---	---	---	---
Prunes, dried (3 States).......	---	---	---	"	7/198	161	148	---	---	---	---	---	---
Prunes, other than dried (3 States).	---	---	---	"	7/106	7/129	43	---	---	---	---	---	---
Oranges (5 States).	---	---	---	Boxes	99,700	108,535	111,290	---	---	---	1.11	1.34	1.46
Grapefruit (4 States).......	---	---	---	"	50,722	36,500	48,520	---	---	---	.61	1.69	1.11
Lemons (Calif.)....	---	---	---	"	13,055	11,630	12,500	---	---	---	1.86	4.31	1.86
Cranberries (5 States).......	26	27	27	Barrels	715	840	7/980	27.7	31.1	36.2	---	---	---
Pecans.............	---	---	---	Pounds	120,955	128,174	112,503	---	---	---	---	---	---
Tung nuts (5 States).......	---	---	---	Tons	28	88	39	---	---	---	---	---	---
Commercial truck crops............	3,559	3,521	3,441	---	---	---	---	---	---	---	---	---	---
For market (25 crops)...	1,785	1,785	1,823	---	---	---	---	---	---	---	---	---	---
For processing (11 crops)...	1,774	1,736	1,618	---	---	---	---	---	---	---	---	---	---
Total 52 crops 8/..	342,123	356,868	341,036	---	---	---	---	---	---	---	---	---	---

1/ Bags of 100 pounds.
2/ Dry weight
3/ Green weight
4/ Bags of 100 pounds (uncleaned)
5/ All purposes
6/ 1,000 trees tapped
7/ Includes some quantities not harvested
8/ Excluding crops not harvested, minor crops, duplicated seed acreages, strawberries, and other fruits
9/ Total equivalent sugar per tree

The above table gives a detailed summary of the 1950 acreage, production and yield per acre of all crops for which information is available. Prices are also given where available.

Crop production in 1950 was the third largest on record, despite reductions in acreage of several important crops and a somewhat unfavorable growing season.

Yields per acre were relatively high. For all major crops, except wheat and broomcorn, yields were higher than average. New high yield marks were set for rice, tobacco, potatoes and sweetpotatoes. Only a few yields were lower than in 1949 -- among them corn, buckwheat, sorghum grain and forage, cotton, dry beans, soybeans, sorgo sirup and sugar beets. The composite yield index of 142 per cent is slightly higher than in 1949 and second only to the index of 151 per cent in 1948.

The over-all volume of crop production in 1950 was 126 per cent of the 1923-32 average. This index is well below the 137.5 per cent in 1948 and 132 per cent in 1949, but exceeds that of any other season. It was attained despite a smaller total harvested acreage of 52 principal crops than in any year since 1942.

Planted acreage for the 52 principal crops in 1950 totaled nearly 358 million acres, about 12 million less than in 1949. Compared with 1949, heavy reductions were made in some crops under allotment programs -- cotton, more than 9 million acres, corn, nearly 4 million; winter wheat, over 9 million, spring wheat, over 4 million. On the other hand, acreages of oats and barley were each increased over 2 million, soybeans over 3 million, sorghums nearly 5 million

(Continued on back)

DOANE AGRICULTURAL DIGEST ® JAN., 1951

DOANE AGRICULTURAL SERVICE, Inc., St. Louis 6, Mo

1950 YIELD SUMMARY MAJOR CROPS

State	CORN		ALL WHEAT		OATS		SOYBEANS		COTTON LINT		ALL HAY	
	Average 1939-48	1950	Average 1939-48	1950	Average 1939-48	1950	Average 1939-48	1950	Average 1939-48	1950	Average 1939-48	1950
Maine	38.9	35.0	--	--	38.6	49.0	--	--	--	--	0.96	0.89
N. H.	41.6	45.0	--	--	36.5	42.0	--	--	--	--	1.15	1.15
Vt.	39.4	45.0	--	--	32.7	35.0	--	--	--	--	1.39	1.37
Mass.	42.4	40.0	--	--	31.7	33.0	--	--	--	--	1.56	1.58
R. I.	38.9	40.0	--	--	31.6	33.0	--	--	--	--	1.38	1.51
Conn.	42.1	43.0	--	--	33.9	38.0	--	--	--	--	1.52	1.68
N. Y.	36.1	41.0	24.8	28.9	32.0	43.0	14.8	18.0	--	--	1.48	1.59
N. J.	40.7	54.0	22.6	21.5	30.0	39.0	15.5	19.0	--	--	1.61	1.80
Pa.	41.7	45.5	20.4	22.0	31.0	38.0	15.2	17.0	--	--	1.43	1.48
Ohio	48.3	52.0	22.8	22.0	37.6	36.0	19.3	22.0	--	--	1.45	1.49
Ind.	48.2	49.5	19.8	21.5	35.0	37.0	18.4	22.0	--	--	1.36	1.42
Ill.	50.0	51.0	19.2	20.0	39.7	42.5	21.2	24.0	--	--	1.42	1.65
Mich.	34.2	38.5	23.6	26.0	37.4	39.5	16.4	19.5	--	--	1.38	1.39
Wisc.	42.0	41.0	20.6	24.1	41.3	48.5	14.2	14.5	--	--	1.67	1.79
Minn.	42.2	38.0	17.5	16.7	37.6	37.0	15.4	15.5	--	--	1.47	1.44
Iowa	51.6	47.0	19.8	21.9	35.8	41.0	19.6	22.0	--	--	1.56	1.74
Mo.	32.2	45.0	16.1	18.0	24.6	31.0	15.0	23.0	442	288	1.17	1.31
N. D.	22.1	19.0	15.1	13.9	29.1	28.0	1/11.0	10.5	--	--	.96	.94
S. D.	25.2	26.5	12.7	10.4	31.2	26.5	1/14.1	12.5	--	--	.84	.73
Nebr.	25.6	37.0	18.4	21.9	26.6	25.0	15.6	24.0	--	--	.99	1.13
Kans.	22.3	35.5	16.0	14.5	23.7	22.0	11.1	18.0	--	--	1.55	1.68
Del.	28.6	36.0	19.1	17.0	30.0	28.0	12.5	14.0	--	--	1.30	1.39
Md.	35.0	40.0	19.4	18.5	30.5	34.0	13.4	16.0	--	--	1.31	1.36
Va.	30.8	49.0	16.3	18.5	26.3	32.5	14.8	19.0	378	133	1.13	1.27
W. Va.	34.5	37.0	17.1	18.5	25.1	28.5	12.9	13.5	--	--	1.21	1.28
N. C.	24.2	37.0	15.1	14.5	27.0	29.5	12.0	17.0	373	152	.99	1.09
S. C.	16.6	23.0	13.8	14.0	24.3	28.0	7.9	12.0	321	220	.78	.82
Ga.	12.6	16.5	12.3	12.5	22.7	27.0	6.8	8.5	243	227	.54	.62
Fla.	10.6	14.0	--	--	16.5	18.0	--	--	162	217	.54	.60
Ky.	30.6	37.0	15.0	15.0	22.5	24.0	15.2	17.5	--	--	1.28	1.39
Tenn.	26.5	34.0	13.7	12.5	24.6	25.0	13.5	21.0	378	319	1.15	1.32
Ala.	14.7	22.5	13.9	15.0	22.3	26.0	11.5	18.0	272	209	.73	.86
Miss.	16.9	26.5	24.7	21.0	32.4	31.0	12.8	24.0	330	316	1.23	1.39
Ark.	18.7	27.0	12.7	15.0	27.5	29.5	14.6	21.0	344	315	1.14	1.27
La.	15.8	23.0	--	--	29.1	27.5	12.8	18.0	269	283	1.23	1.40
Okla.	17.9	25.0	13.8	9.0	19.8	17.5	7.4	17.0	164	134	1.22	1.39
Tex.	16.1	21.0	12.4	8.0	21.8	19.5	--	--	170	208	.95	1.11
Mont.	16.8	19.0	17.2	19.3	32.3	36.0	--	--	--	--	1.21	1.15
Idaho	44.2	47.0	27.4	27.8	41.2	45.0	--	--	--	--	2.09	2.12
Wyo.	14.7	17.0	18.0	18.6	30.3	32.0	--	--	--	--	1.13	1.03
Colo.	18.0	24.0	18.9	16.9	30.8	26.0	--	--	--	--	1.54	1.47
N.Mex.	14.0	14.0	11.5	6.4	21.7	23.0	--	--	498	529	2.14	2.36
Ariz.	10.6	11.0	21.4	24.0	29.2	30.0	--	--	433	771	2.24	2.54
Utah	30.1	40.0	23.1	19.6	42.5	46.5	--	--	--	--	2.01	1.91
Nev.	30.8	35.0	27.8	27.7	40.3	45.0	--	--	--	--	1.45	1.47
Wash.	44.9	58.0	26.3	26.5	45.5	49.0	--	--	--	--	1.95	1.99
Ore.	34.7	37.0	25.2	24.9	32.4	32.0	--	--	--	--	1.76	1.70
Calif.	32.2	34.0	17.7	21.0	29.6	32.0	--	--	600	770	2.85	3.03
U.S.	32.9	37.6	17.0	16.6	32.8	34.9	18.8	21.6	261	265	1.35	1.41

1/ Short-time Average

and all hay by 2-3/4 million acres. Sorghums were planted on much land previously used for cotton and on some abandoned winter wheat acreage.

The 1950 season emphasized the importance of farm mechanization, as power machinery enabled producers to wait out periods of bad weather and make rapid progress with field work when conditions became favorable.

Harvested acreages of the principal crops amounted to about 341 million acres, the smallest total since 1942. It was nearly 16 million acres less than the relatively large 1949 total, and almost 21 million acres less than the record of 361.8 million acres harvested in 1932. The changes from last year in total acreages, by regions, tend to reflect the effects of allotment programs as well as the kind of crop season. Acreage losses, the difference between planted and harvested acreages, amount to 16,750,000 acres. This is the largest since 1939. More than half the total was abandoned winter wheat acreage, mostly in the Great Plains.

The third-largest tonnage of feed grains was harvested in 1950. The 125 million ton total is nearly a million tons less than in 1949 and a tenth below the 1948 record of 138 million. Including fairly large carryover stocks, the farm supply of feed grains for the 1950-51 season is third largest of record. Supplies of hay per animal unit, including the large 1950 cut of 107 million tons and an average carryover, are the most abundant in history. Also, mild fall weather permitted prolonged and excellent grazing of pasture, meadows and fields. However, the severe winter cold since the middle of November has caused heavy feeding.

Oilseed production of 14.7 million tons is the third largest, only 6 per cent less than the record 1949 tonnage, but more than a fourth above average. Soybeans account for well over half of the 1950 production, but their sharp increase does not offset decreases from last year on flaxseed and cottonseed. Cottonseed tonnage is expected to be less than two-thirds that of 1949 and a sixth below average.

1948 CROP SUMMARY

AGRICULTURAL MARKETING SERVICE UNITED STATES DEPARTMENT OF AGRICULTURE

CROP	ACREAGE HARVESTED (in thousands)			PRODUCTION (in thousands)				YIELD PER ACRE			PRICES			
	Average 1937-46	1947	1948	Unit	Average 1937-46	1947	1948	Average 1937-46	1947	1948	5-yr. Av. 1909-14	5-yr. Av. 1935-39	Nov. 15 1947	Nov. 15 1948
Corn, all	89,616	83,932	85,439	Bushels	2,813,529	2,383,970	3,650,548	31.4	28.4	42.7	$.642	$.691	$2.19	$1.21
Wheat, all	58,832	74,389	71,904	"	942,623	1,367,186	1,288,406	16.1	18.4	17.9	.884	.837	2.74	2.04
Winter	41,724	54,835	52,859	"	688,606	1,068,048	990,098	16.6	19.5	18.7	---	---	---	---
All spring	17,107	19,554	19,045	"	254,017	299,138	298,308	14.9	15.3	15.7	---	---	---	---
Durum	2,549	2,948	3,187	"	34,619	44,328	44,742	14.0	15.0	14.0	---	---	---	---
Other spring	14,558	16,606	15,858	"	219,398	254,810	253,566	15.1	15.3	16.0	---	---	---	---
Oats	38,056	38,451	40,191	"	1,231,814	1,199,422	1,491,752	32.3	31.2	37.1	.399	.340	1.09	.756
Barley	12,615	11,014	12,046	"	298,811	281,185	317,037	23.7	25.5	26.3	.619	.533	1.87	1.15
Rye	3,055	2,010	2,097	"	37,398	25,975	26,384	12.1	12.9	12.6	.720	.554	2.49	1.51
Buckwheat	416	518	377	"	7,022	7,334	6,324	16.9	14.2	18.8	---	---	---	---
Flaxseed	2,938	4,030	4,737	"	26,756	40,536	52,533	9.0	10.1	11.1	1.69	1.69	6.48	5.74
Rice	1,298	1,693	1,743	"	60,460	78,259	81,170	46.9	46.2	46.6	.813	.742	2.77	2.33
Popcorn	120	82	149	Pounds	170,810	102,325	293,160	1,437	1,240	1,966	---	---	---	---
Sorghums for grain	6,221	5,629	7,298	Bushels	99,791	96,016	131,644	15.7	17.1	18.0	---	---	---	---
Sorghums for forage	8,431	4,871	5,144	Tons 1/	11,975	6,078	7,616	1.42	1.25	1.48	---	---	---	---
Sorghums for silage	858	669	633	Tons 2/	4,969	3,448	4,549	5.74	5.15	7.19	---	---	---	---
Cotton, lint	22,631	21,269	23,003	Bales	12,014	11,857	14,937	254.2	267.3	311.5	.124	.103	.319	.305
Cottonseed	---	---	---	Tons	4,947	4,681	6,036	---	---	---	22.55	27.52	89.10	69.00
Hay, all	73,018	75,489	73,616	Tons	97,563	102,765	99,846	1.34	1.36	1.36	11.87	8.87	17.30	18.40
Hay, wild	12,966	14,820	14,947	Tons	11,437	13,479	12,848	.88	.91	.86	---	---	---	---
Alfalfa seed	854	996	614	Bushels	1,260	1,700	990	1.49	1.71	1.61	---	---	---	---
Red clover seed	1,646	1,394	1,830	"	1,578	1,262	1,774	1.04	.91	.97	---	---	---	---
Alsike clover seed	139	128	140	"	325	375	388	2.37	2.92	2.78	---	---	---	---
Sweetclover seed	325	217	188	"	853	574	533	2.65	2.65	2.83	---	---	---	---
Lespedeza seed	809	732	975	Pounds	167,695	149,760	241,560	205	204	248	---	---	---	---
Timothy seed	426	397	132	Bushels	1,525	1,589	424	3.56	4.00	3.22	---	---	---	---
Sudan grass seed	138	57	59	Pounds	49,763	21,540	23,800	350	380	405	---	---	---	---
Beans, dry edible	1,832	1,759	1,917	Bags 3/	16,716	17,218	20,833	914	979	1087	3.37	3.52	12.10	7.88
Peas, dry field	412	520	292	Bags 3/	5,278	6,513	3,584	1242	1252	1227	---	1.40	5.13	4.90
Soybeans for beans	7,162	11,212	10,311	Bushels	134,642	183,558	220,201	18.8	16.4	21.4	---	---	---	---
Cowpeas for peas	1,117	587	531	"	5,854	3,466	3,416	5.3	5.9	6.4	---	---	---	---
Peanuts picked and threshed	2,534	3,380	3,214	Pounds	1,750,704	2,182,895	2,268,110	700	646	706	.05	.04	.10	.11
Velvetbeans 4/	1,885	1,036	821	Tons	763	407	350	813	786	853	---	---	---	---
Potatoes	2,826	2,101	2,099	Bushels	392,143	389,048	445,850	139.3	185.2	212.4	.697	.717	1.64	1.44
Sweetpotatoes	728	594	514	"	64,866	55,746	49,806	89.2	93.9	96.9	.878	.807	[illegible]	1.98
Tobacco	1,644	1,845	1,538	Pounds	1,664,265	2,109,581	1,897,926	1008	1143	1234	.10	.168	.40	.428
Sorgo sirup	191	161	110	Gallons	11,437	9,845	7,625	60.0	6111	69.3	---	---	---	---
Sugarcane for sugar and seed	297	321	328	Tons	6,060	5,297	6,309	20.3	16.5	19.3	---	---	---	---
Sugarcane sirup	124	112	81	Gallons	21,113	20,270	13,790	170	181	170	---	---	---	---
Sugar beets	784	881	700	Tons	9,771	12,504	9,418	12.4	14.2	13.5	---	---	---	---
Maple sugar	1/9,592	1/8,568	1/8,059	Pounds	508	305	229	4/1.92	4/1.94	4/1.46	---	---	---	---
Maple sirup	1/9,592	1/8,568	1/8,059	Gallons	2,273	2,039	1,445	1.92	[illegible]	1.46	---	---	---	---
Broomcorn	276	232	190	Tons	43	34	30	308	[illegible]	[illegible]	---	---	---	---
Hops	35	40	40	Pounds	43,532	50,098	49,819	1240	1262	1252	---	---		---
Apples, commercial crop	---	---	---	Bushels	2/115,058	2/113,041	2/90,288	---	---	---	.96	.90	2.15	[illegible]
Peaches, total	---	---	---	"	2/66,725	2/82,270	2/65,749	---	---	---	---	---	---	---
Pears, total	---	---	---	"	2/30,222	2/35,312	26,399	---	---	---	---	---	---	---
Grapes, total	---	---	---	Tons	2/ 2,705	3,024	2,998	---	---	---	---	---	---	---
Cherries (12 States)	---	---	---	Tons	2/ 170	173	217	---	---	---	---	---	---	---
Apricots (3 States)	---	---	---	Tons	2/ 240	2/ 202	2/ 250	---	---	---	---	---	---	---
Plums (2 States)	---	---	---	Tons	2/ 79	78	70	---	---	---	---	---	---	---
Prunes, dried (3 States)	---	---	---	Tons	207	198	171	---	---	---	---	---	---	---
Prunes, other than dried (3 States)	---	---	---	Tons	2/ 119	2/ 94	2/ 123							
Oranges (5 States)	---	---	---	Boxes	93,087	114,380	118,900	---	---	---	---	1.11	.93	.66
Grapefruit (4 States)	---	---	---	Boxes	47,478	61,630	56,250	---	---	---	---	.61	.65	.34
Lemons (Calif.)	---	---	---	Boxes	12,808	12,870	13,100	---	---	---	---	---	---	---
Cranberries (5 States)	---	---	---	Barrels	674	790	922	---	---	---	---	---	---	---
Pecans	---	---	---	Pounds	109,476	118,639	153,812	---	---	---	---	---	---	---
Tung nuts (5 states)	---	---	---	Tons	3/ 21	53	67	---	---	---	---	---	---	---
Commercial truck crops:	3,565	3,722	3,512	---	---	---	---	---	---	---	---	---	---	---
For market (25 crops)	1,854	1,843	1,802	---	---	---	---	---	---	---	---	---	---	---
For processing (11 crops)	1,711	1,879	1,710	---	---	---	---	---	---	---	---	---	---	---
Total 52 crops 4/	339,663	348,899	350,857											

1/Dry Weight
2/Green Weight
3/Bags of 100 pounds (uncleaned)
4/All purposes.

The above table gives a detailed summary of the acreage, production and yield per acre of all crops for which information is available.

Total production of all crops harvested for exceeds that of any other year. The growing season was so favorable that, with the improved farm practices of recent years, new record yields per acre for corn, cotton, oats soybeans, potatoes, tobacco and dry beans were obtained. Because of large acreage, rice and peanuts both reached record production, although yields were slightly below average. Yields of peas and sugarcane were also below average.

Planted acreage of principal crops amounted to 362.2 million acres, about 3.7 million more than in the preceding season. This reflects not only the persistant efforts of farmers to seed winter wheat despite sever drouth in the fall of 1947, but also the favorable spring season in all sections of the country. Most of the acreage on which winter wheat was abandoned was replanted to sorghums, corn or spring grains, depending on the area.

Losses in acreage, the difference between planted and harvested acreages of crops, amounted to 3.1 per cent of the total planted. While larger than the acreage lost in each of the preceding years, this total was less than in any year between 1931 and 1944. Major losses resulted from winter kill and spring drough damage to late planted and poorly developed winter wheat.

U.S.D.A. Data

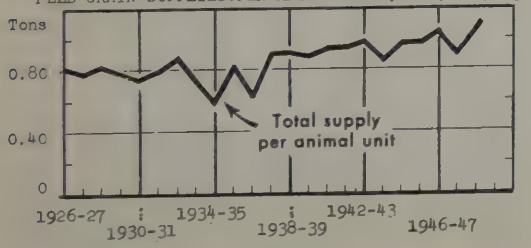
1948 YIELD SUMMARY MAJOR CROPS

All yields are on per acre basis.

	CORN		ALL WHEAT		OATS		SOYBEANS		COTTON LINT		ALL HAY	
State	Average 1937-46	1948	Average 1937-46	1948	Average 1937-46	1948	Average 1937-46	1948	Average 1937-46	1948	Average 1937-46	1948
Maine	39.5	34.0	--	--	37.7	43.0	--	--	--	--	0.93	1.00
N. H.	41.6	37.0	--	--	36.5	40.0	--	--	--	--	1.14	1.20
Vt.	38.6	44.0	--	--	32.0	37.0	--	--	--	--	1.33	1.53
Mass.	41.6	41.0	--	--	31.1	34.0	--	--	--	--	1.52	1.76
R. I.	38.2	37.0	--	--	30.7	33.0	--	--	--	--	1.35	1.47
Conn.	40.8	40.0	--	--	32.6	37.0	--	--	--	--	1.49	1.66
N. Y.	36.1	40.0	14.5	27.4	31.1	40.0	14.9	16.0	--	--	1.44	1.61
N. J.	39.0	50.0	22.4	21.5	29.6	35.0	1/15.3	16.5	--	--	1.61	1.77
Pa.	40.8	46.5	20.4	19.0	30.3	38.0	15.4	16.0	--	--	1.41	1.46
Ohio	47.1	58.5	21.9	24.5	36.7	45.0	19.4	20.5	--	--	1.46	1.44
Ind.	46.5	60.0	18.5	21.5	33.4	43.0	18.0	21.5	--	--	1.37	1.36
Ill.	49.2	61.0	18.2	24.0	39.4	47.0	21.4	24.0	--	---	1.40	1.50
Mich.	34.7	39.0	22.5	26.0	36.3	38.5	16.0	17.5	--	--	1.39	1.37
Wisc.	40.2	44.5	19.0	23.6	38.9	44.0	14.5	13.0	--	--	1.68	1.36
Minn.	40.5	52.5	17.1	17.5	36.9	42.5	14.9	18.5	--	---	1.48	1.37
Iowa	51.6	61.0	19.0	25.0	36.3	45.0	19.8	23.0	--	--	1.58	1.37
Mo.	30.5	45.5	14.7	22.0	25.2	27.5	14.2	20.0	451	459	1.13	1.32
N. D.	21.1	26.0	14.0	14.3	27.9	28.0	1/10.8	13.0	--	--	.95	.92
S. D.	22.2	36.0	11.4	13.1	29.8	33.5	1/13.9	18.0	--	--	.81	.83
Nebr.	22.6	36.0	16.8	20.4	26.1	28.0	1/14.5	22.0	--	--	.94	1.03
Kans.	20.4	33.5	14.5	17.5	23.7	23.0	10.6	15.0	--	--	1.44	1.83
Del.	28.0	31.0	19.1	14.5	29.0	35.0	13.0	12.5	--	--	1.30	1.33
Md.	34.7	39.0	19.6	16.0	30.0	33.5	13.5	15.5	--	--	1.32	1.38
Va.	27.8	43.0	15.6	18.5	24.9	33.5	14.3	16.5	342	480	1.14	1.29
W. Va.	31.4	44.0	16.2	19.5	23.7	29.0	12.6	13.5	--	--	1.20	1.31
N. C.	21.8	31.0	14.3	15.5	25.9	29.5	11.5	13.5	355	454	.98	1.04
S. C.	15.5	20.0	12.8	14.0	23.8	23.0	7.2	10.0	308	377	.76	.92
Ga.	11.9	15.5	11.5	13.5	21.7	26.0	6.4	7.5	238	279	.55	.57
Fla.	10.4	10.0	--	--	15.4	19.0	--	--	159	239	.55	.54
Ky.	28.2	41.0	15.2	16.0	21.6	27.0	14.0	19.0	--	--	1.26	1.28
Tenn.	25.3	33.0	13.1	14.5	22.9	29.5	11.5	20.0	366	416	1.14	1.16
Ala.	13.9	21.5	13.2	15.5	21.4	26.5	8.9	19.0	261	356	.74	.80
Miss.	16.2	24.0	1/25.2	22.0	31.7	33.0	11.3	18.0	324	444	1.22	1.33
Ark.	18.0	26.5	11.4	17.5	25.6	32.5	14.0	19.5	337	410	1.11	1.40
La.	15.8	18.5	--	--	29.2	32.0	12.6	14.0	265	392	1.23	1.14
Okla.	17.4	25.0	13.4	14.5	19.8	17.5	7.1	12.0	165	172	1.20	1.39
Tex.	16.0	16.5	11.6	10.0	23.1	16.5	---	--	170	176	.97	.87
Mont.	15.5	19.0	16.1	19.1	31.5	36.5	---	--	--	--	1.20	1.24
Idaho	43.6	45.0	27.3	25.4	40.7	42.0	--	--	--	--	2.06	2.17
Wyo.	13.6	18.0	16.4	19.7	29.5	30.0	--	--	--	--	1.14	.96
Colo.	15.2	24.0	17.3	21.0	30.2	32.0	--	--	--	--	1.50	1.70
N.Mex.	14.0	14.0	11.4	9.2	22.2	21.0	--	--	489	540	2.05	2.34
Ariz.	10.5	12.0	21.8	23.0	28.2	30.0	--	--	424	559	2.26	2.36
Utah	28.7	27.0	22.9	21.6	41.4	42.0	--	--	--	--	1.99	2.07
Nev.	31.4	27.0	26.8	29.6	39.3	41.0	--	--	--	--	1.45	1.48
Wash.	41.2	53.0	25.5	28.7	45.1	42.5	--	--	--	--	1.92	2.11
Ore.	33.2	35.0	24.3	28.5	31.9	31.5	--	--	--	--	1.74	1.79
Calif.	32.2	33.0	18.2	17.5	29.5	30.0	--	--	589	572	2.80	2.93
U.S.	31.4	42.7	16.1	17.9	32.3	37.1	18.8	21.4	254.2	311.5	1.34	1.36

1/ Short-time Average

FEED GRAIN SUPPLIES:PER ANIMAL UNIT,U.S.,1926-48



Source: U.S.D.A. - B.A.E.

Total feed grain production in 1948 amounted to 137.4 million tons. This was 44 per cent more than the small total last year and 11 per cent above the 1946 record. Carryover stocks of all feed grains were small, but this, added to the record harvest, results in the largest supply per animal unit in history. The number of grain consuming animal units will not show much increase until the spring pigs are farrowed. The estimated supply of all feed concentrates in 1949 is 1.07 tons per grain consuming animal unit.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

1947 CROP SUMMARY

AGRICULTURAL MARKETING SERVICE UNITED STATES DEPARTMENT OF AGRICULTURE

CROP	ACREAGE HARVESTED (in thousands)			PRODUCTION (in thousands)				YIELD PER ACRE			PRICES			
	Average 1936-45	1946	1947	Unit	Average 1936-45	1946	1947	Average 1936-45	1946	1947	5-yr.Av. 1910-14	10-yr.Av. 1930-39	Nov.15 1946	Nov.15 1947
Corn, all..........	90,083	88,489	83,981	Bushels	2,639,102	3,249,950	2,400,952	29.4	36.7	28.6	$.642	$.584	$1.27	$2.19
Wheat, all.........	57,036	67,075	74,186	"	890,306	1,153,046	1,364,919	15.6	17.2	18.4	.884	.711	1.89	2.74
Winter............	40,684	48,350	54,780	"	653,893	870,725	1,067,970	16.1	18.0	19.5	---	---	---	---
All spring.......	16,353	18,725	19,406	"	236,413	282,321	296,949	14.4	15.1	15.3	---	---	---	---
Durum..........	2,458	2,453	2,925	"	31,847	35,836	43,983	13.1	14.6	15.0	---	---	---	---
Other spring...	13,895	16,272	16,481	"	204,566	246,485	252,966	14.6	15.1	15.3	---	---	---	---
Oats...............	37,101	43,205	38,648	"	1,161,282	1,497,904	1,215,970	31.2	34.7	31.5	.399	.307	.782	1.09
Barley.............	12,407	10,411	10,947	"	287,360	262,258	279,182	22.9	25.2	25.5	.619	.455	1.32	1.87
Rye................	3,164	1,607	2,022	"	37,934	18,879	25,977	11.9	11.7	12.8	.720	.508	2.07	2.49
Buckwheat..........	415	391	518	"	6,954	7,124	7,334	16.8	18.2	14.2	.730	.602	1.46	1.97
Flaxseed...........	2,807	2,432	4,026	"	25,030	22,585	39,763	8.5	9.3	9.9	1.69	1.52	6.90	6.48
Rice...............	1,239	1,574	1,677	"	58,220	72,216	79,345	47.4	45.9	47.3	.813	.688	2.30	2.72
Popcorn............	110	155	81	Pounds	151,152	253,092	96,395	1,371	1,637	1,194	---	---	---	---
Sorghums for grain.	5,823	6,773	5,606	Bushels	92,124	106,941	95,609	15.2	15.8	17.1	---	---	2.27	3.29
Sorghums for forage	8,504	6,240	4,861	Tons 5/	11,773	8,601	6,070	1.37	1.38	1.25	---	---	---	---
Sorghums for silage	869	644	668	Tons 6/	4,888	3,685	3,445	5.55	5.72	5.16	---	---	---	---
Cotton, lint.......	23,845	17,615	21,148	Bales	12,390	8,640	11,694	250.6	235.3	265.4	9/.124	9/.0936	9/.292	9/.319
Cottonseed.........	---	---	---	Tons	5,143	3,513	4,744	---	---	---	22.55	21.37	89.90	89.10
Hay, all...........	72,373	74,173	75,291	Tons	94,490	100,739	102,500	1.30	1.36	1.36	11.87	---	17.20	17.30
Hay, all tame......	59,732	60,312	60,691	Tons	83,515	89,195	89,194	---	---	---	---	9.40	---	---
Hay, wild..........	12,641	13,861	14,600	Tons	10,975	11,544	13,306	.87	.83	.91	---	6.08	---	---
Alfalfa seed.......	801	1,174	1,021	Bushels	1,179	1,822	1,699	1.49	1.55	1.66	---	9.41	22.40	14.50
Red clover seed....	1,453	2,601	1,375	"	1,435	2,142	1,195	1.06	.82	.87	---	9.88	23.00	28.70
Alsike clover seed.	146	166	137	"	320	446	366	2.27	2.69	2.67	---	9.36	21.20	20.50
Sweet clover seed..	339	236	211	"	874	628	564	2.60	2.66	2.68	---	3.06	6.29	6.57
Lespedeza seed.....	746	935	756	Pounds	151,164	206,800	153,960	197	221	204	---	5.95	7.74	9.18
Timothy seed.......	427	365	413	Bushels	1,488	1,319	1,641	3.44	3.61	3.98	---	2.10	2.97	2.13
Sudan grass seed...	145	65	55	Pounds	50,302	23,300	20,740	335	361	378	---	---	---	---
Beans, dry edible..	1,833	1,616	1,759	Bags 7/	16,312	15,859	17,164	889	981	976	3.37	3.15	12.50	12.10
Peas, dry field....	386	498	520	Bags 7/	4,870	6,758	6,513	1,220	1,357	1,252	---	1.35	4.84	5.13
Soybeans for beans.	6,418	9,806	11,125	Bushels	117,886	201,275	181,362	18.2	20.5	16.3	---	.865	3.09	3.43
Cowpeas for peas...	1,197	566	587	"	6,239	3,263	3,458	5.2	5.8	5.9	---	1.38	---	4.48
Peanuts, picked and threshed.........	2,383	3,142	3,378	Pounds	1,672,885	2,038,355	2,251,640	719	649	667	4.80	3.02	9.53	10.1
Velvetbeans 8/......	1,995	1,075	1,036	Tons	806	433	407	812	806	786	---	---	---	---
Potatoes...........	2,862	2,598	2,112	Bushels	376,122	484,174	384,407	131.6	186.3	182.0	.697	.652	1.23	1.66
Sweetpotatoes......	738	676	611	"	64,200	66,424	57,178	87.2	98.2	93.5	.878	.778	2.00	1.95
Tobacco............	1,592	1,962	1,875	Pounds	1,548,389	2,319,409	2,167,702	971	1,182	1,156	.100	.163	43.8	40.0
Sorgo sirup........	198	177	162	Gallons	11,537	11,934	9,885	58.5	67.4	61.0	---	---	---	---
Sugarcane for sugar and seed.........	293	311	322	Tons	6,049	5,967	5,353	20.6	19.2	16.6	---	---	---	---
Sugarcane sirup....	126	120	112	Gallons	20,835	24,450	20,270	165	204	181	---	---	---	---
Sugar beets........	781	802	887	Tons	9,617	10,562	12,248	12.3	13.2	13.8	---	---	---	---
Maple sugar........	1/9,942	1/8,000	1/8,568	Pounds	543	372	305	10/1.96	10/1.37	10/1.94	---	---	---	---
Maple sirup........	1/9,942	1/8,000	1/8,568	Gallons	2,381	1,328	2,039				---	---	---	---
Broomcorn..........	277	300	226	Tons	42	44	33	302	291	290	---	---	---	---
Hops...............	34	41	40	Pounds	2/40,742	53,171	50,098	1,191	1,306	1,262	---	.19	.69	.882
Flax, fiber (Oreg.)	7.8	7.6	5.0	Tons	13.3	14.4	9.2	1.59	1.90	1.90	---	---	---	---
Apples, commercial crop............	---	---	---	Bushels	2/112,896	2/119,410	2/112,503	---	---	---	.96	.786	2.35	2.17
Peaches, total.....	---	---	---	"	2/62,936	2/ 86,643	2/ 82,981	---	---	---	---	.847	---	---
Pears, total.......	---	---	---	"	2/29,510	34,447	2/ 35,350	---	---	---	---	.644	---	---
Grapes, total......	---	---	---	Tons	2/ 2,579	3,120	3,094	---	---	---	---	---	---	---
Cherries, (12 states)	---	---	---	"	2/ 159	230	181	---	---	---	---	---	---	---
Apricots, (3 states)	---	---	---	"	2/ 232	339	199	---	---	---	---	---	---	---
Plums, (2 states)..	---	---	---	"	2/ 76	106	77	---	---	---	---	---	---	---
Prunes, dried (3 states)..........	---	---	---	"	203	221	201	---	---	---	---	---	---	---
Prunes, other than dried (3 states).	---	---	---	Tons	2/ 93	2/ 127	2/ 91	---	---	---	---	---	---	---
Oranges (5 states).	---	---	---	Boxes	86,678	118,680	112,560	---	---	---	---	1.18	1.49	.93
Grapefruit (4 states)..........	---	---	---	Boxes	44,593	59,520	62,270	---	---	---	---	---	1.10	.65
Lemons (Calif.)....	---	---	---	Boxes	12,186	13,760	14,100	---	---	---	---	---	2.75	1.20
Cranberries (5 states)..........	---	---	---	Barrels	639	857	785	---	---	---	---	---	---	---
Pecans (12 states).	---	---	---	Pounds	107,784	76,706	100,209	---	---	---	---	---	---	---
Tung nuts (5 states)..........	---	---	---	Tons	3/ 15	57	67	---	---	---	---	---	---	---
Commercial truck crops:	3,383	4,109	3,694	---	---	---	---	---	---	---	---	---	---	---
For market (25 crops)...	1,741	2,047	1,844	---	---	---	---	---	---	---	---	---	---	---
For processing (11 crops)...	1,642	2,062	1,850	---	---	---	---	---	---	---	---	---	---	---
Total 52 crops 4/..	336,552	344,931	348,355	---	---	---	---	---	---	---	---	---	---	---

1/ 1,000 trees tapped.
2/ Includes some quantities not harvested.
3/ Short-time average.
4/ Excluding crops not harvested, minor crops, duplicated seed acreages, strawberries and other fruits.
5/ Dry weight.
6/ Green weight.
7/ Bags of 100 pounds (uncleaned)
8/ All purposes.
9/ Price per pound.
10/ Total equivalent sugar per tree.

The above table gives a detailed summary of the acreage, production, and yield per acre of all crops for which information is available.

Total acreage of all crops harvested is larger than last year, and well above the 10-year average. Substantial increases are recorded for wheat, rye, buckwheat, flax, cotton, dry edible beans, soybeans, and sugar beets over last year. Crops with more than a 10 per cent acreage cut include oats, sorghums for grain, potatoes, popcorn, broomcorn, red clover seed and commercial truck crops.

Substantial cuts in per-acre yield partially account for the decreased production of such crops as corn, oats, dry field peas, soybeans, and sugar cane.

Nearly 358 million acres were planted to various crops in 1947. Favorable weather in the fall of 1946 for the planting of fall sown grains, and determined efforts by farmers to get their crops in this past spring, despite severe weather handicaps in many areas, made this tremendous acreage possible. Farmers were aided in their efforts by an improved farm labor situation and by an increased supply of machinery and spare parts.

Losses in acreage, the difference between planted and harvested acres, amounted to only 2.5 per cent of the total planted. This is the smallest loss for any year since 1929.

U.S.D.A. Data

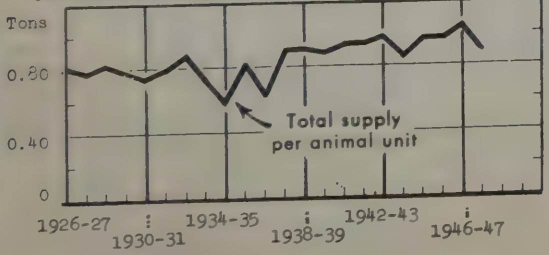
1947 YIELD SUMMARY MAJOR CROPS

All yields are on per acre basis.

	CORN		ALL WHEAT		OATS		SOYBEANS		COTTON LINT		ALL HAY	
State	Average 1936-45	1947	Average 1936-45	1947	Average 1936-45	1947	Average 1936-45	1947	Average 1936-45	1947	Average 1936-45	1947
Me.	39.7	40.0	19.8	---	37.2	35.0	---	---	---	---	0.93	1.08
N. H.	41.6	44.0	---	---	36.6	32.0	---	---	---	---	1.12	1.26
Vt.	38.2	40.0	---	---	31.8	27.0	---	---	---	---	1.30	1.51
Mass.	41.2	46.0	---	---	30.8	36.0	---	---	---	---	1.47	1.62
R. I.	38.0	44.0	---	---	30.7	33.0	---	---	---	---	1.32	1.58
Conn.	40.2	48.0	---	---	31.8	35.0	---	---	---	---	1.44	1.68
N. Y.	35.3	32.5	23.9	24.0	29.3	27.5	14.6	15.0	---	---	1.39	1.61
N. J.	38.0	43.0	22.0	25.0	29.6	25.0	1/14.8	17.0	---	---	1.56	1.70
Pa.	40.6	42.5	20.1	24.0	29.4	29.0	15.3	16.0	---	---	1.37	1.50
Ohio	45.5	41.0	21.1	22.5	35.5	26.0	19.2	18.5	---	---	1.41	1.40
Ind.	44.0	43.0	18.1	23.0	32.2	30.0	17.5	18.5	---	---	1.32	1.36
Ill.	45.8	39.5	18.4	21.5	37.8	35.0	20.6	18.0	---	---	1.35	1.47
Mich.	34.4	27.5	21.9	25.0	34.3	35.0	15.8	17.0	---	---	1.38	1.32
Wis.	37.8	42.0	18.0	24.5	36.8	43.0	14.3	13.0	---	---	1.66	1.67
Minn.	37.9	36.5	16.1	17.7	35.6	36.0	14.4	15.0	---	---	1.43	1.42
Iowa	47.6	32.0	18.8	20.5	35.3	33.0	18.9	15.0	---	---	1.54	1.55
Mo.	27.6	24.5	14.7	18.5	23.9	23.0	12.8	12.0	439	355	1.08	1.15
N. Dak.	19.4	20.5	13.1	14.3	26.4	28.5	1/10.8	10.0	---	---	.92	.96
S. Dak.	19.5	19.0	10.5	14.5	28.3	31.0	1/13.8	11.5	---	---	.79	.86
Nebr.	20.0	19.5	15.9	20.9	24.4	27.5	1/13.7	14.5	---	---	.91	1.13
Kans.	18.8	17.0	14.1	19.3	23.0	29.0	9.9	8.5	---	---	1.39	1.54
Del.	29.3	32.5	18.9	21.0	28.9	32.0	12.6	13.0	---	---	1.28	1.36
Md.	34.5	36.0	19.6	21.0	29.6	32.0	13.4	13.0	---	---	1.27	1.36
Va.	26.4	38.0	15.0	17.5	23.6	27.0	13.8	15.0	332	360	1.08	1.06
W. Va.	30.3	41.0	15.7	20.5	22.8	28.5	12.4	14.0	---	---	1.14	1.16
N. C.	21.0	30.5	13.6	17.0	24.4	29.5	11.4	15.0	348	341	.96	.99
S. C.	15.0	20.0	11.9	16.5	22.7	26.0	6.9	10.0	301	290	.74	.78
Ga.	11.3	15.0	11.0	14.0	20.7	25.0	6.3	7.0	238	246	.55	.51
Fla.	10.4	12.5	---	---	15.1	20.0	---	---	161	192	.55	.51
Ky.	26.2	35.0	15.2	16.0	20.2	23.0	13.1	17.5	---	---	1.19	1.44
Tenn.	24.4	29.0	12.8	15.0	21.4	26.5	10.4	15.5	352	358	1.09	1.24
Ala.	13.6	15.5	12.6	15.5	20.5	23.0	7.9	18.0	259	291	.74	.74
Miss.	16.0	16.5	1/25.7	23.0	31.2	30.0	10.4	14.0	331	322	1.19	1.22
Ark.	17.2	17.0	10.8	15.5	24.7	31.0	12.8	12.0	325	297	1.08	1.01
La.	15.7	14.5	---	---	29.6	27.0	12.6	12.5	276	281	1.22	1.17
Okla.	16.3	18.0	12.7	15.5	19.3	23.5	6.9	5.5	158	148	1.16	1.18
Tex.	15.8	16.5	11.3	17.0	22.8	21.0	---	---	168	195	.96	.85
Mont.	15.0	18.0	15.1	14.9	30.1	31.0	---	---	---	---	1.18	1.16
Idaho	43.2	45.0	26.7	28.8	39.9	44.0	---	---	---	---	2.07	2.20
Wyo.	12.6	19.0	14.9	20.7	28.9	33.0	---	---	---	---	1.14	1.19
Colo.	14.0	23.0	16.6	23.4	29.8	34.5	---	---	---	---	1.50	1.65
N. Mex.	13.6	13.5	11.2	14.5	22.2	21.0	---	---	477	525	2.02	2.23
Ariz.	10.8	11.0	22.0	21.0	28.5	28.0	---	---	415	468	2.24	2.19
Utah	28.4	38.0	22.5	24.8	40.7	48.0	---	---	---	---	1.99	2.10
Nev.	30.8	32.0	26.2	29.1	38.7	41.0	---	---	---	---	1.44	1.55
Wash.	39.2	53.0	24.7	23.8	45.2	52.0	---	---	---	---	1.90	1.96
Oreg.	32.7	41.0	23.8	22.8	32.0	34.0	---	---	---	---	1.73	1.69
Calif.	32.2	32.0	18.2	16.5	29.5	27.0	---	---	586	682	2.77	2.96
U. S.	29.4	28.6	15.6	18.4	31.2	31.5	18.2	16.3	250.6	265.4	1.30	1.36

1/ Short-time average.

FEED GRAIN SUPPLIES:PER ANIMAL UNIT,U.S.,1926-46



Total feed-grain production in 1947 amounted to 96 million tons, nearly 23 per cent below the record-breaking tonnage produced in 1946. However, the number of grain consuming animal units also declined during 1947, and feed carryover was larger than a year earlier, so the cut in supplies per animal unit is proportionately smaller. The estimated supply in 1948 is .9 tons per animal unit.

Source: U.S.D.A. - B.A.E.

1949 CROP SUMMARY

AGRICULTURAL MARKETING SERVICE UNITED STATES DEPARTMENT OF AGRICULTURE

CROP	ACREAGE HARVESTED (in thousands)			PRODUCTION (in thousands)				YIELD PER ACRE			PRICES		
	Average 1938-47	1948	1949	Unit	Average 1938-47	1948	1949	Average 1938-47	1948	1949	5-yr.Av 1935-39	Nov.15 1948	Nov.15 1949
Corn, all	88,617	86,067	86,735	Bushels	2,787,628	3,618,793	3,377,790	31.4	42.0	38.9	$.691	$1.21	$1.02
Wheat, all	59,854	73,017	76,751	"	991,950	1,313,534	1,146,463	16.6	18.0	14.9	.837	2.04	1.90
Winter	42,500	53,515	55,453	"	726,553	1,007,863	901,668	17.0	18.8	16.3	---	---	---
All spring	17,353	19,502	21,298	"	265,397	305,671	244,795	15.4	15.7	11.5	---	---	---
Durum	2,565	3,187	3,525	"	36,956	44,680	38,864	14.5	14.0	11.0	---	---	---
Other spring	14,788	16,315	17,773	"	229,141	260,991	205,931	15.5	16.0	11.6	---	---	---
Oats	38,347	40,198	40,560	"	1,234,052	1,491,304	1,322,924	32.1	37.1	32.6	.340	.756	.664
Barley	12,720	11,987	9,879	"	304,741	315,694	238,104	24.0	26.4	24.1	.533	1.15	1.10
Rye	2,874	2,096	1,558	"	35,109	26,449	18,697	12.2	12.6	12.0	.554	1.51	1.27
Buckwheat	426	336	279	"	7,075	6,305	5,184	16.7	18.8	18.6	---	---	---
Flaxseed	3,248	4,859	4,880	"	30,102	54,529	43,664	9.3	11.2	8.9	1.69	5.74	3.57
Rice	1,357	1,781	1,821	"	62,944	85,056	89,141	46.6	47.8	49.0	.742	2.32	1.[illegible]
Popcorn	119	159	97	Pounds	170,665	309,125	156,597	1,440	1,939	1,615	---	---	---
Sorghums for grain	6,292	7,296	6,612	Bushels	102,398	131,596	152,630	16.3	18.0	23.1	---	2.14	1.66
Sorghums for forage	8,314	5,139	4,164	Tons 1/	11,812	7,602	6,541	1.41	1.48	1.57	---	---	---
Sorghums for silage	867	631	624	" 2/	5,015	4,529	4,423	5.74	7.18	7.09	---	---	---
Cotton, lint	21,396	22,821	26,898	Bales	11,306	14,877	16,034	254.0	312.6	28[illegible]	.103	.305	.288
Cottonseed	---	---	---	Tons	4,631	5,945	6,477	---	---	---	27.52	69.00	42.30
Hay, all	73,966	73,208	72,835	"	99,539	99,471	99,305	1.34	1.36	1.36	8.37	23.30	21.50
Hay, wild	13,291	14,684	14,918	"	11,855	12,678	12,296	.89	.86	.82	---	---	---
Alfalfa seed	893	635	946	Bushels	1,316	1,045	1,896	1.47	1.64	2.00	---	---	---
Red clover seed	1,754	1,790	1,239	"	1,654	1,789	1,262	.94	1.00	1.02	---	---	---
Alsike clover seed	142	141	116	"	340	396	344	2.44	2.81	2.97	---	---	---
Sweet clover seed	316	194	235	"	809	574	598	2.59	2.96	2.55	---	---	---
Lespedeza seed	825	982	1,001	Pounds	172,026	240,960	244,600	207	245	244	---	---	---
Timothy seed	406	129	292	Bushels	1,425	405	826	3.5	3.14	2.83	---	---	---
Beans, dry edible	1,839	1,916	1,852	Bags 3/	16,555	20,5[illegible]7	21,[illegible]4	919	1,077	1,14[illegible]	[illegible]	7.55	[illegible]
Peas, dry field	442	292	335	" 3/	5,610	3,560	3,267	1,2[illegible]	1,2[illegible]	975	1.40	4.90	3.15
Soybeans for beans	8,025	10,430	9,912	Bushels	148,381	223,006	[illegible],305	18.5	21.4	22.4	---	2.36	[illegible]
Cowpeas for peas	1,029	534	478	"	5,420	3,45[illegible]	[illegible],9[illegible]	[illegible].4	[illegible].4	[illegible]	---	---	---
Peanuts picked and threshed	2,718	3,311	2,433	Pounds	1,845,718	2,338,470	1,[illegible]3,140	694	706	76[illegible]	.04	.11	.10
Velvetbeans 4/	1,786	821	778	Tons	714	350	337	[illegible]0[illegible]	[illegible]	[illegible]	---	---	---
Potatoes	2,730	2,109	1,901	Bushels	393,403	454,654	401,9[illegible]	144.[illegible]	215.[illegible]	211.4	.717	1.44	1.34
Sweetpotatoes	711	516	542	"	63,620	50,304	[illegible]4,23[illegible]	89.[illegible]	97.4	100.1	.707	1.96	1.59
Tobacco	1,654	1,554	1,626	Pounds	1,718,375	1,950,3[illegible]	1,9[illegible],1[illegible]9	1,0[illegible]	1,[illegible]74	1,[illegible]4	.2[illegible]	.428	.434
Sorgo sirup	186	110	90	Gallons	11,173	7,[illegible]	[illegible],01[illegible]	60.1	69.7	[illegible]	---	---	---
Sugarcane for sugar and seed	299	335	341	Tons	5,95[illegible]	[illegible],77[illegible]	7,[illegible]	19.[illegible]	[illegible]0.3	[illegible]1.4	---	---	---
Sugarcane sirup	121	79	69	Gallons	[illegible]0,756	13,[illegible]90	1[illegible],770	171	1[illegible]9	17[illegible]	---	---	---
Sugar beets	796	694	690	Tons	10,145	9,4[illegible]	10,1[illegible]	1[illegible].7	13.[illegible]	14.[illegible]	---	---	---
Maple sugar	5/9,315	5/8,059	5/7,924	Pounds	460	[illegible]9	[illegible]92	9/1.9[illegible]	9/1.4[illegible]	9/1.[illegible]	---	---	---
Maple sirup	5/9,315	5/8,059	5/7,924	Gallons	2,22[illegible]	1,445	1,[illegible]14	9/1.9[illegible]	9/1.4[illegible]	9/1.[illegible]7	---	---	---
Broomcorn	271	191	248	Tons	42	30	44	[illegible]	32[illegible]	[illegible]	---	---	---
Hops	36	40	37	Pounds	44,146	49,[illegible]19	[illegible]/49,340	1,[illegible]	1,[illegible]	1,334	---	---	---
Apples, commercial crop	---	---	---	Bushels	6/111,114	6/8[illegible],407	6/133,[illegible]	---	---	---	.90	[illegible].35	1.43
Peaches, total	---	---	---	"	6/68,947	6/6[illegible],35[illegible]	6/[illegible]4,7[illegible]	---	---	---	---	---	---
Pears, total	---	---	---	"	6/30,83[illegible]	6/[illegible],334	6/3[illegible]	---	---	---	---	---	---
Grapes, total	---	---	---	Tons	6/2,736	6/[illegible],044	[illegible],[illegible]0[illegible]	---	---	---	---	---	---
Cherries (12 States)	---	---	---	"	6/172	6/214	[illegible]	---	---	---	---	---	---
Apricots (3 States)	---	---	---	"	6/227	6/247	6/[illegible]	---	---	---	---	---	---
Plums (2 States)	---	---	---	"	6/80	70	[illegible]/96	---	---	---	---	---	---
Prunes, dried (3 States)	---	---	---	"	6/210	[illegible]/184	175	---	---	---	---	---	---
Prunes, other than dried (3 States)	---	---	---	"	6/121	[illegible]/[illegible]4	6/127	---	---	---	---	---	---
Oranges (5 States)	---	---	---	Boxes	97,123	104,020	110,000	---	---	---	1.11	[illegible]	[illegible]4
Grapefruit (4 States)	---	---	---	"	50,528	4[illegible],[illegible]0	3[illegible],[illegible]0	---	---	---	.[illegible]1	.34	[illegible]
Lemons (Calif.)	---	---	---	"	13,164	9,950	1[illegible],000	---	---	---	---	---	---
Cranberries (5 States)	26	27	27	Barrels	665	9[illegible]	[illegible]7	---	---	---	---	---	---
Pecans	---	---	---	Pounds	110,620	177,6[illegible]7	11[illegible],[illegible]94	---	---	---	---	---	---
Tung nuts (5 States)	---	---	---	Tons	7/24	5[illegible]	[illegible]	---	---	---	---	---	---
Commercial truck crops	3,523	3,500	3,514	---	---	---	---	---	---	---	---	---	---
For market (25 crops)	1,780	1,802	1,786	---	---	---	---	---	---	---	---	---	---
For processing (11 crops)	1,743	1,698	1,728	---	---	---	---	---	---	---	---	---	---
Total 52 crops 8/	340,709	352,297	356,041	---	---	---	---	---	---	---	---	---	---

1/ Dry weight
2/ Green weight
3/ Bags of 100 pounds (uncleaned)
4/ All purposes
5/ 1,000 trees tapped
6/ Includes some quantities not harvested
7/ Short-time average
8/ Excluding crops not harvested, minor crops, duplicated seed acreages, strawberries, and other fruits
9/ Total equivalent sugar per tree

The above table gives a detailed summary of the 1949 acreage, production and yield per acre of all crops for which information is available. Prices are also given for those crops where information is available.

The production of principal crops harvested was second only to the record 1948 total. This was the result of uniformly large production of most crops, with only a few either outstandingly larger or smaller than usual. The acreage in crops was larger than in any recent year, with acreage abandonment about average.

Yields per acre were about average for most crops, with only a few individual crops reaching new high marks. Record high yields were set by grain sorghums, dry beans and soybeans. Rice, peanuts, velvetbeans, sweetpotatoes, sugar cane, sugar beets and maple products also exceeded the high 1948 yields. The crop season was mostly favorable, particularly for planting and for harvesting late crops, but several important areas suffered setbacks sometime during the season.

The overall volume of crop production in 1949 is 13[illegible] per cent of the 1923-32 average. Planted acreage of principal crops amounted to about [illegible].4 million acres in 1949, nearly 6 million acres more than in 1948. The total is greater than in any year since the peak period of 1930-32, exceeding the wartime high of 1944 by more than 4 million acres. The largest winter wheat acreage ever seeded and the big increase in cotton this year were major factors in total acreage. Changes in other crops tended to offset each other. Most of the acreage on which fall-sown grains were abandoned was replanted to spring grains, sorghums, corn, or cotton, depending on the area.

DOANE AGRICULTURAL DIGEST [illegible] JAN. 1950
This material is based on factual information believed to be accurate but not guaranteed [illegible]
DOANE AGRICULTURAL SERVICE INC. [illegible] Mo.

1949 YIELD SUMMARY MAJOR CROPS

All yields are on per acre basis.

State	CORN		ALL WHEAT		OATS		SOYBEANS		COTTON LINT		ALL HAY	
	Average 1938-47	1949	Average 1938-47	1949	Average 1938-47	1949	Average 1938-47	1949	Average 1938-47	1949	Average 1938-47	1949
Maine	39.7	42.0	--	--	37.7	42.0	--	--	--	--	0.96	0.95
N. H.	42.0	44.0	--	--	36.2	37.0	--	--	--	--	1.15	1.08
Vt.	38.8	45.0	--	--	32.1	31.0	--	--	--	--	1.36	1.30
Mass.	42.1	41.0	--	--	31.7	31.0	--	--	--	--	1.53	1.50
R. I.	38.8	38.0	--	--	31.1	30.0	--	--	--	--	1.37	1.39
Conn.	41.7	40.0	--	--	33.2	37.0	--	--	--	--	1.51	1.59
N. Y.	35.8	42.0	24.5	27.9	31.4	29.0	14.8	18.0	--	--	1.46	1.27
N. J.	39.4	45.0	22.6	24.0	29.1	34.0	15.5	16.5	--	--	1.60	1.70
Pa.	40.6	46.5	20.6	23.0	30.5	30.0	15.4	17.0	--	--	1.43	1.42
Ohio	46.9	56.0	22.3	25.5	36.4	36.0	19.4	24.0	--	--	1.46	1.46
Ind.	46.3	52.0	19.2	22.5	33.3	38.5	18.2	23.0	--	--	1.37	1.44
Ill.	48.3	56.0	18.6	24.5	38.2	43.0	21.2	26.0	--	--	1.42	1.70
Mich.	34.0	48.0	23.2	27.0	37.0	36.0	16.2	22.0	--	--	1.38	1.32
Wisc.	41.3	50.0	19.9	22.5	40.0	41.0	14.5	16.5	--	--	1.71	1.60
Minn.	40.6	44.0	17.2	15.7	36.6	36.0	15.0	17.5	--	--	1.48	1.39
Iowa	50.1	49.0	19.0	18.9	34.8	38.0	19.5	22.5	--	--	1.59	1.62
Mo.	30.2	41.0	15.2	18.0	24.5	24.0	14.4	21.0	451	377	1.14	1.36
N. D.	21.2	19.5	14.6	10.6	28.6	21.5	1/10.7	12.0	--	--	.96	.86
S. D.	22.8	21.0	12.3	8.4	30.8	23.0	1/13.6	13.0	--	--	.83	.66
Nebr.	23.5	32.5	17.5	14.5	26.8	22.0	14.5	22.0	--	--	.98	1.10
Kans.	21.0	29.0	15.3	11.5	24.0	21.5	10.6	14.5	--	--	1.50	1.66
Del.	28.4	30.0	19.6	18.5	29.6	30.0	12.8	15.0	--	--	1.30	1.34
Md.	34.7	38.0	19.8	19.0	30.4	33.0	13.4	16.0	--	--	1.32	1.43
Va.	29.0	47.0	15.9	18.5	25.4	30.0	14.4	18.0	348	300	1.12	1.33
W. Va.	32.8	44.0	16.7	19.5	24.4	25.5	12.8	13.0	--	--	1.20	1.26
N. C.	23.0	35.0	14.8	13.0	26.6	30.0	11.8	15.0	355	270	.99	1.16
S. C.	16.0	22.5	13.5	10.0	24.2	26.0	7.6	11.0	309	211	.76	.96
Ga.	12.2	18.0	12.0	12.0	22.3	25.0	6.6	8.0	235	189	.54	.64
Fla.	10.6	13.0	--	--	16.0	16.0	--	--	164	196	.54	.60
Ky.	29.1	37.5	14.9	17.5	21.8	26.0	14.5	18.5	--	--	1.29	1.41
Tenn.	25.8	32.5	13.4	14.5	23.7	25.0	12.3	19.0	368	375	1.16	1.36
Ala.	14.0	21.0	13.6	15.0	21.8	23.5	10.0	17.0	262	229	.74	.85
Miss.	16.1	23.0	1/25.0	22.0	31.9	30.5	11.8	15.5	318	258	1.21	1.31
Ark.	17.7	24.0	11.8	15.0	26.3	27.0	13.8	20.0	334	325	1.10	1.35
La.	15.6	23.0	--	--	28.6	29.0	12.6	15.0	261	294	1.22	1.38
Okla.	17.4	22.0	13.5	13.0	20.1	20.0	6.9	11.0	163	229	1.21	1.43
Tex.	16.1	22.5	12.2	14.5	22.7	27.0	--	--	170	264	.97	1.12
Mont.	16.4	8.5	16.8	12.5	32.2	29.0	--	--	--	--	1.21	1.08
Idaho	44.0	47.0	27.7	24.8	40.9	41.5	--	--	--	--	2.08	2.16
Wyo.	14.2	17.5	17.3	20.6	30.1	29.5	--	--	--	--	1.15	1.13
Colo.	16.6	25.5	18.3	17.2	30.7	33.5	--	--	--	--	1.53	1.67
N.Mex.	14.0	16.0	11.6	12.3	21.8	23.0	--	--	497	394	2.09	2.30
Ariz.	10.5	12.0	21.3	25.0	28.8	30.0	--	--	423	641	2.23	2.45
Utah	29.9	36.0	23.3	22.1	42.2	47.0	--	--	--	--	1.99	2.17
Nev.	31.4	30.0	27.2	30.8	40.2	40.0	--	--	--	--	1.45	1.55
Wash.	43.0	52.0	25.8	21.2	45.4	47.0	--	--	--	--	1.92	1.86
Ore.	34.0	36.5	24.5	22.1	31.7	33.5	--	--	--	--	1.74	1.59
Calif.	32.2	33.0	17.6	18.5	29.4	27.0	--	--	602	651	2.83	2.81
U.S.	31.4	38.9	16.6	14.9	32.1	32.6	18.7	22.4	254	285	1.34	1.36

1/ Short-time Average

Part of the favorable outcome of the 1949 season was due to the increased use of machinery that better enabled farmers to cope with adverse weather. Fertilizers were more freely available and were applied to an increased extent. Labor supplies were ample. Transportation facilities were adequate and storage facilities increased.

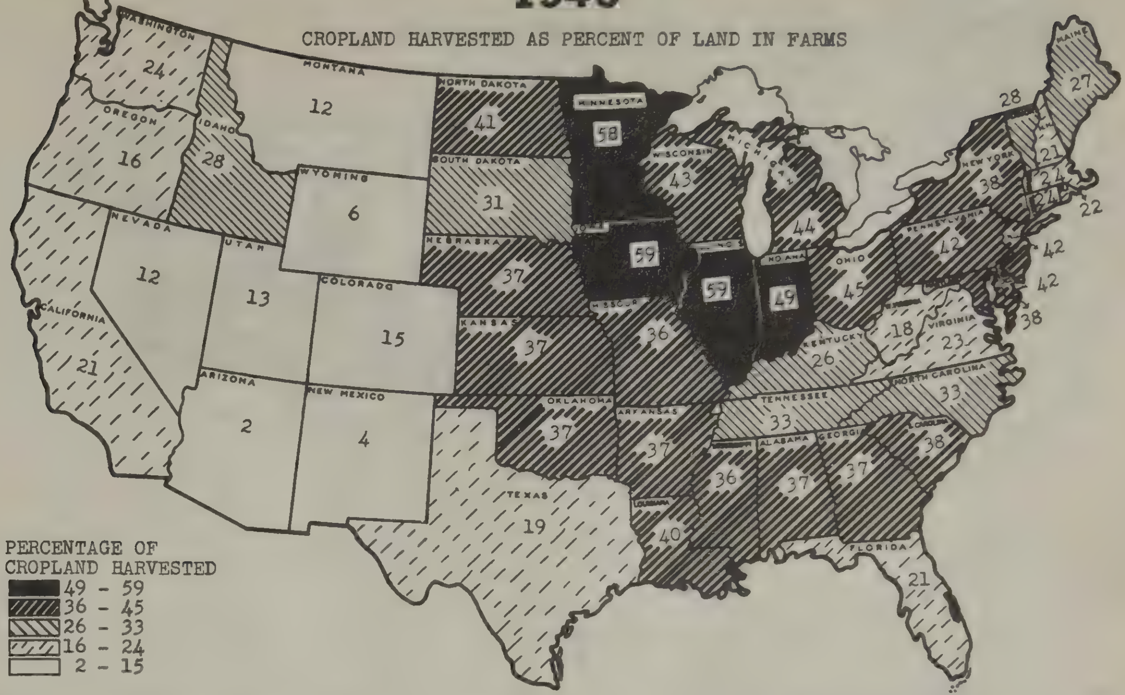
Nearly 4 million acres more of the principal crops were harvested this year than in 1948. Total harvested acreage was 356 million acres. Acreage losses, the difference between planted and harvested acres, amounted to 13.3 million acres in 1949. This is more than in any year since 1943, but near the average of the past ten years. For most important crops, other than winter wheat, acreage losses were relatively light.

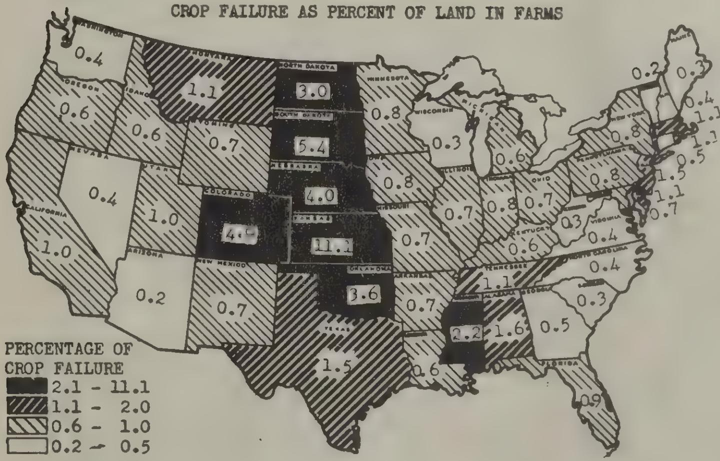
The total production of feed grains of nearly 126 million tons is the second largest on record, exceeded only by last year. This is principally due to the near-record 3,378 million-bushel corn crop, coupled with well-above average crops of oats -- 1,323 million bushels, and grain sorghums -- 153 million bushels. The grain sorghum crop was exceeded only by the 1944 crop. Only the barley crop was far below average.

The huge carryover of feed grains, largely corn from the 1948 crop, plus this year's large crop provide the largest feed grain supply in history, both total and per animal unit. Hay and roughage supplies are also ample in most areas, as the mild fall weather extended the grazing.

Production of oilseeds in 1949 equals the record of 1948 and is 41 per cent above average. Soybean production was slightly below 1948, but cottonseed production was higher, being 9 per cent above 1948 and 40 per cent above average. Peanut and flaxseed crops were smaller.

LAND USE
1940


CROPLAND HARVESTED AS PERCENT OF LAND IN FARMS


CROP FAILURE AS PERCENT OF LAND IN FARMS

The figures in each state on the large map show the percentage of total farm acreage in cropland that was harvested. The two small maps show the remaining cropland and the percentage that was occupied by crops that failed and idle cropland. The combined figures of these three maps show the total cropland for any state. These are data for 1939 as reported by the 1940 census:

Land use for all states classifies as follows:

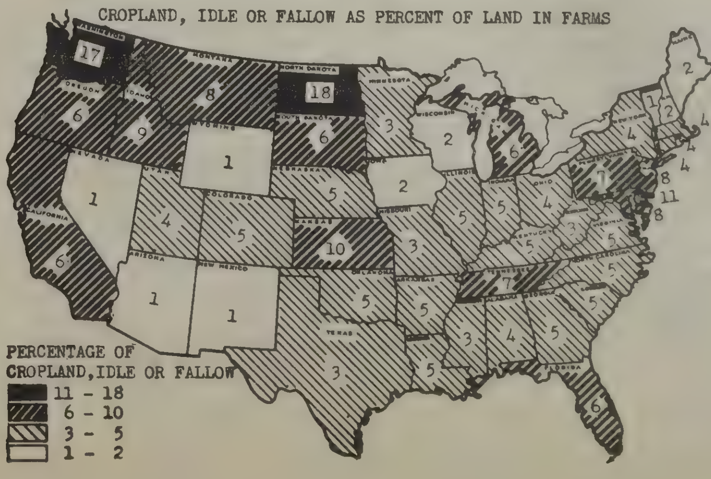
	Acres	%
LAND IN FARMS	1,060,507,355	100
Crop Land, Total		
Cropland Harvested	321,757,900	30
Crop Failure	20,560,659	2
Cropland Idle or Fallow	56,929,837	6
Plowable Pasture	130,924,458	12
Woodland, All	137,067,837	13
All Other	393,266,664	37

These maps show vividly the states where cropland is concentrated. Illinois leads with 65 per cent of the farmland in cropland. Arizona is low with less than 4 per cent of the farmland used for crops.

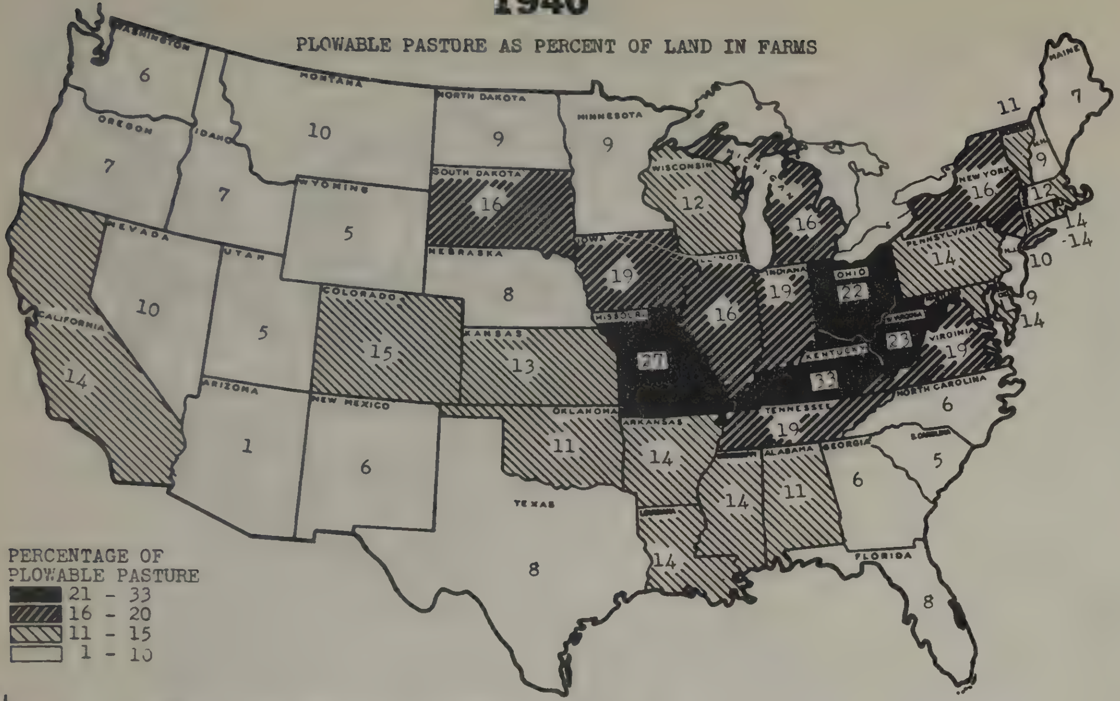
The extent of certainty of cropping in the Great Plains is shown by the concentration of crop failure in the Plains' states beginning with North Dakota and Montana and extending south.

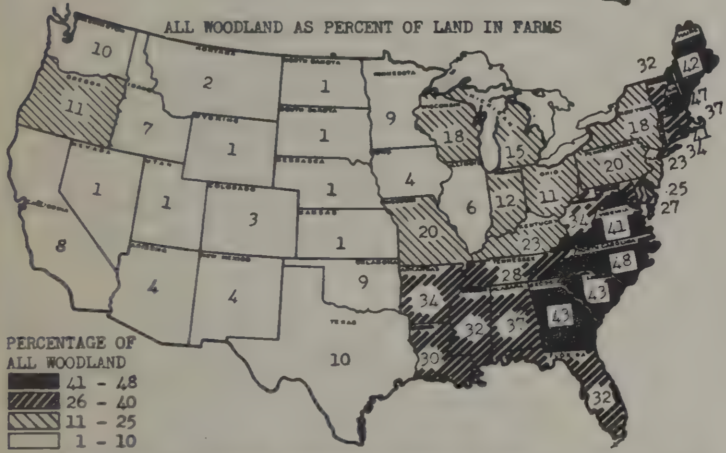
The idle and fallow acreage is probably larger than normal in some states due to the crop reduction programs of the Government.

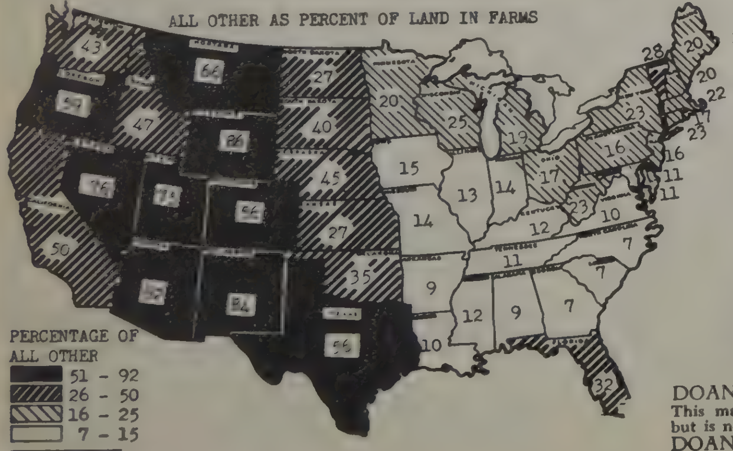
The amount and dependability of agricultural income from year to year tends to correlate with land use. These are basic statistics back of U.S. agriculture and its influence on the business of the nation.


CROPLAND, IDLE OR FALLOW AS PERCENT OF LAND IN FARMS

LAND USE
1940


PLOWABLE PASTURE AS PERCENT OF LAND IN FARMS


ALL WOODLAND AS PERCENT OF LAND IN FARMS


ALL OTHER AS PERCENT OF LAND IN FARMS

Based on Census Data

The figures in each state on the large map show the percentage of total farm acreage in plowable pasture. "Plowable pasture" comprises land used only for pasture which could have been plowed and used for crops without clearing, draining, or irrigating.

Much of this land is not practical to cultivate because of low fertility, rolling to steep topography, small irregular fields, and other limitations. Such land may, however, be brought into cultivation by higher prices or the pressure of more people forced to seek a living in rural areas. Some of this plowable pasture is well adapted to cultivation and is used as pasture as a matter of choice.

The woodlands in farms are concentrated in the eastern two-fifths of the United States and particularly in the South and Southeast. The extreme northeastern tip has a high percentage of farm land in timber. Note that this map does not show timber land that is not included in farms. This is merely the portion of farms in woodland.

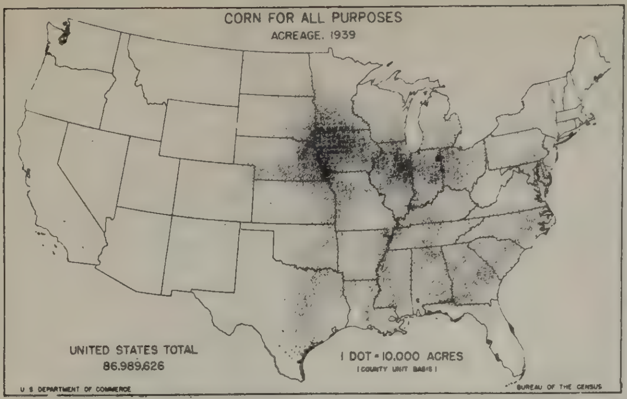
The map at the bottom shows the percentage of land in farms that does not come under the other classifications shown on the other 5 maps on this sheet. Thus, this acreage includes pasture, swamp, waste, and land occupied by buildings.

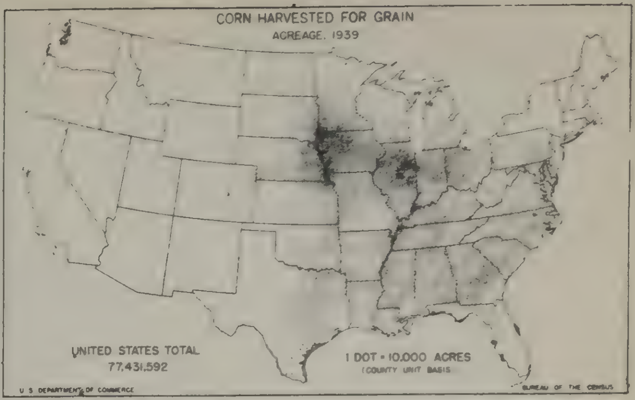
The use of land is dictated by many factors such as quality of soil, topography, rainfall, and other climatic conditions. See how these are mapped on other Digest pages. The use of land tends to set the level of farm income and control the economic development of an area.

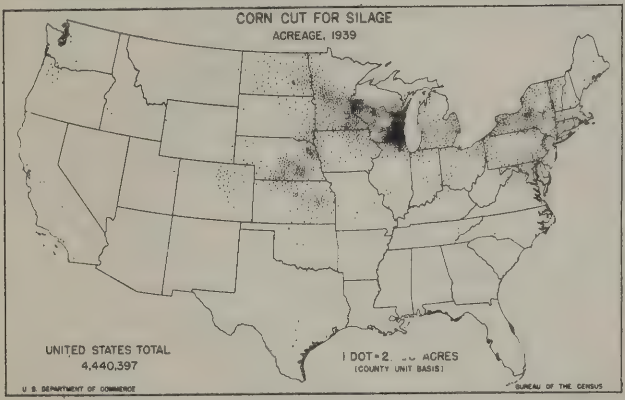
DOANE AGRICULTURAL DIGEST JAN., 1947

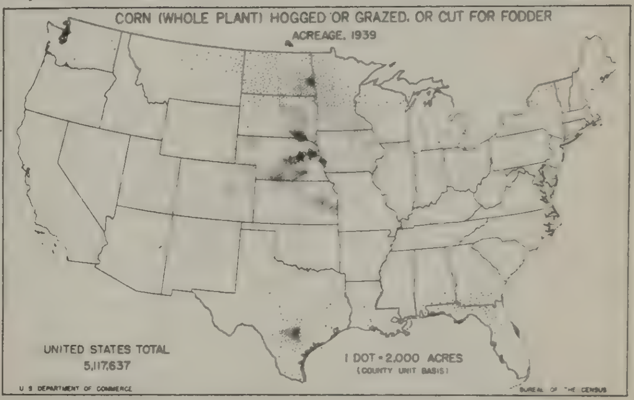
(Printed in U. S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

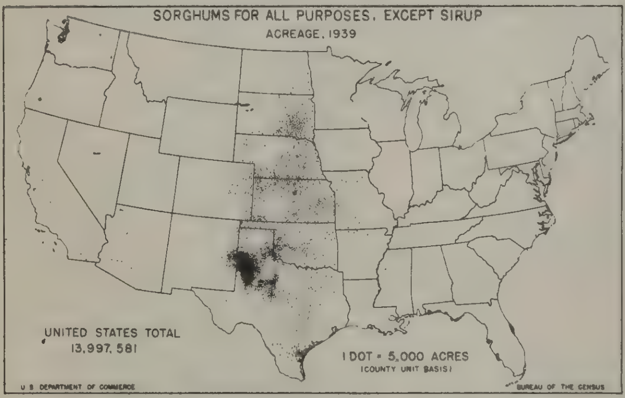
FIELD CROP DISTRIBUTION

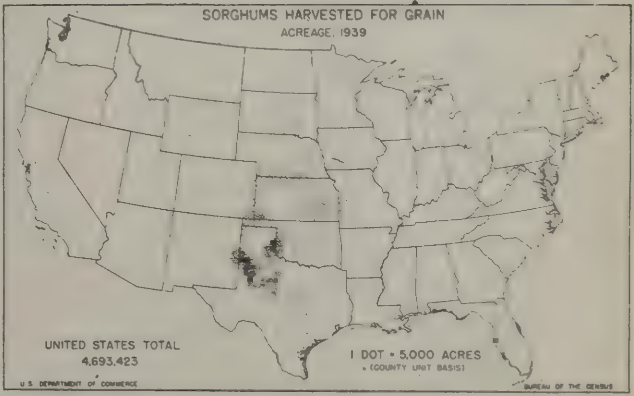


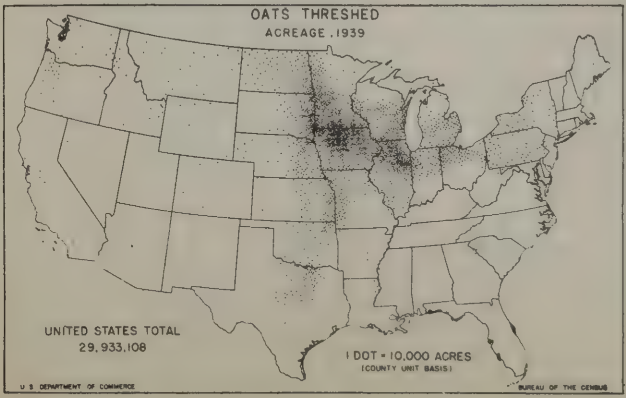


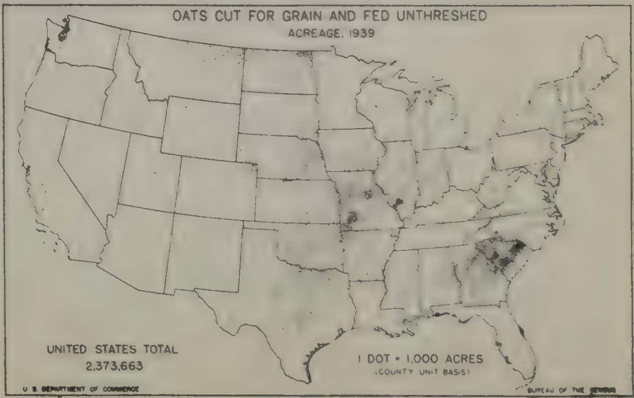






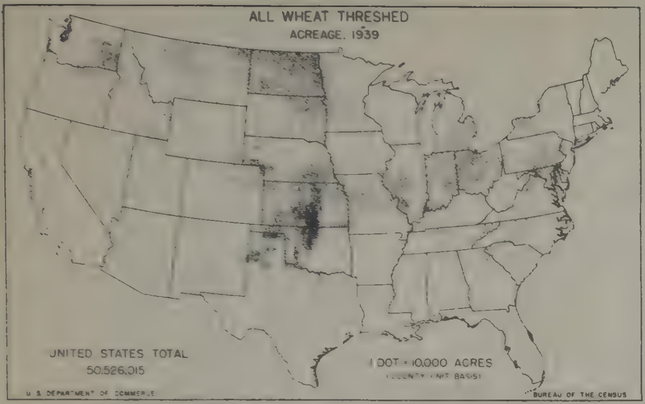






CENSUS OF AGRICULTURE: 1940

FIELD CROP DISTRIBUTION

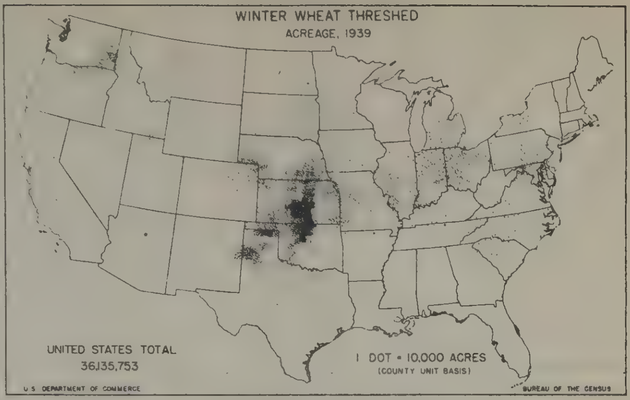


ALL WHEAT THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
50.526.015

1 DOT = 10,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

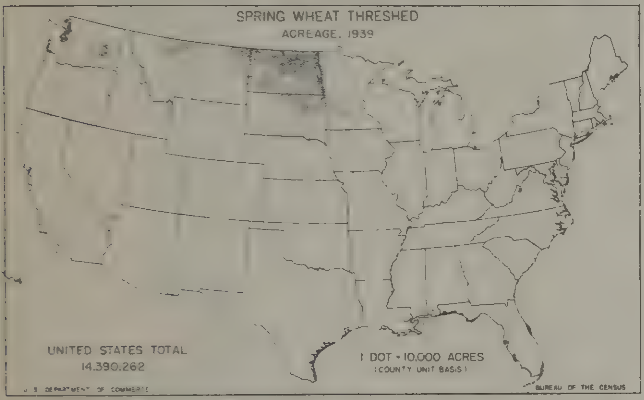


WINTER WHEAT THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
36,135,753

1 DOT = 10,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

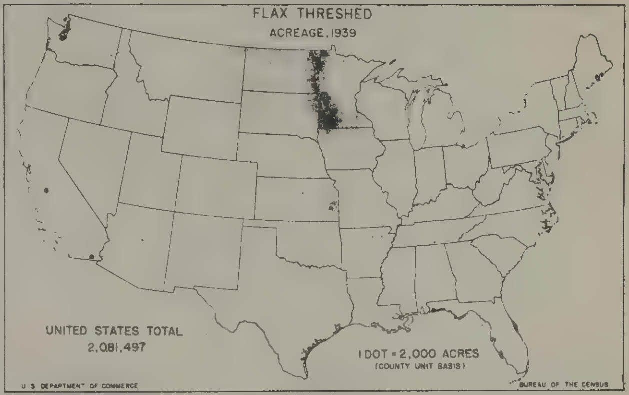


SPRING WHEAT THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
14.390.262

1 DOT = 10,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

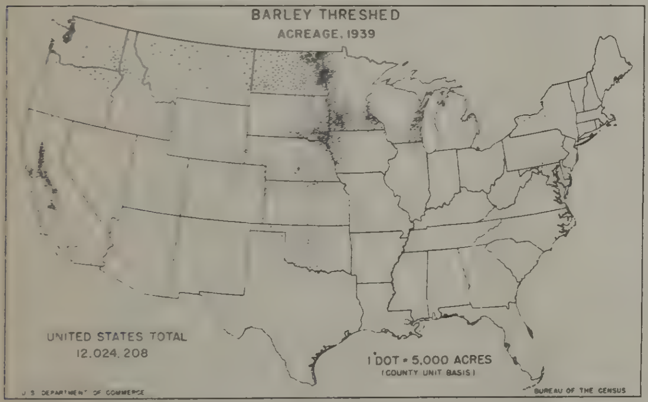


FLAX THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
2,081,497

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

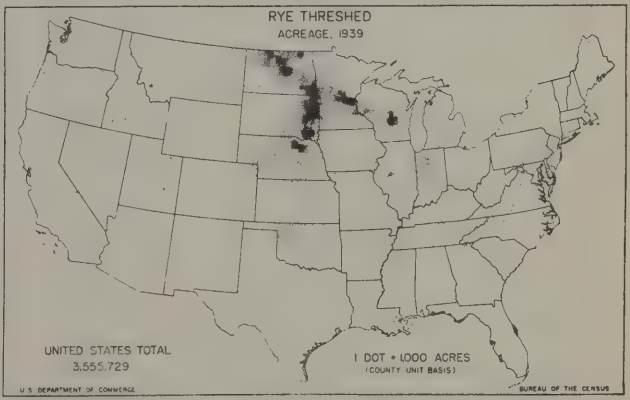


BARLEY THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
12.024.208

1 DOT = 5,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

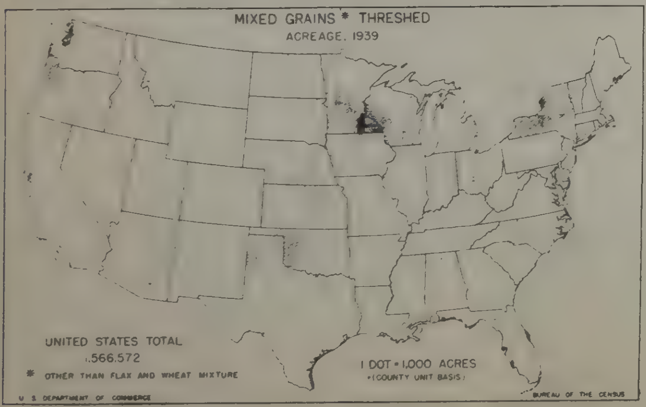


RYE THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
3,555.729

1 DOT = 1,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS



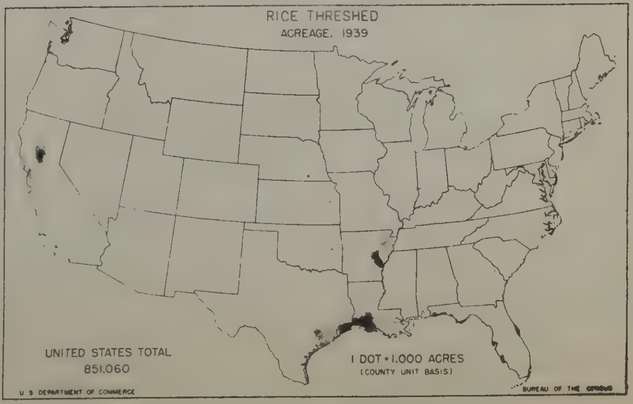
MIXED GRAINS * THRESHED
ACREAGE, 1939

UNITED STATES TOTAL
1.566.572

* OTHER THAN FLAX AND WHEAT MIXTURE

1 DOT = 1,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS



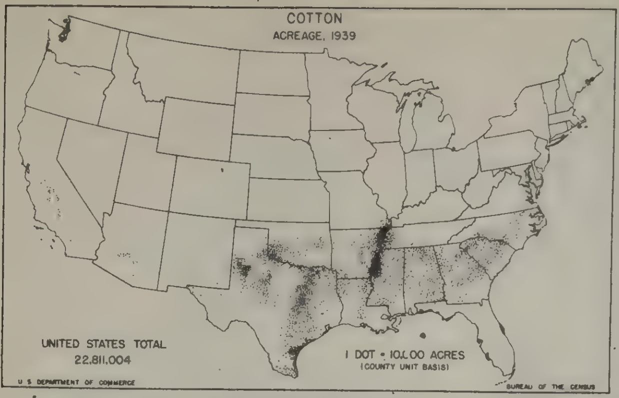
RICE THRESHED
ACREAGE, 1939

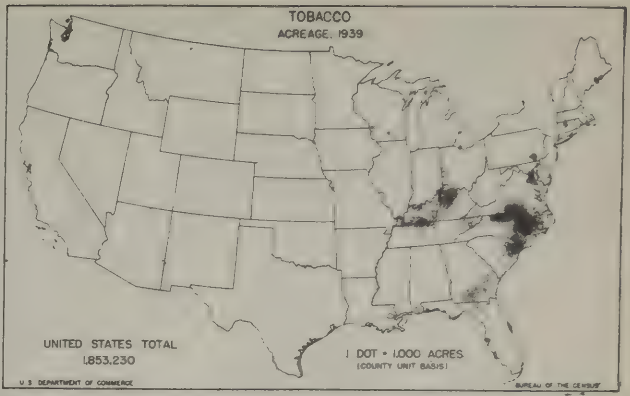
UNITED STATES TOTAL
851,060

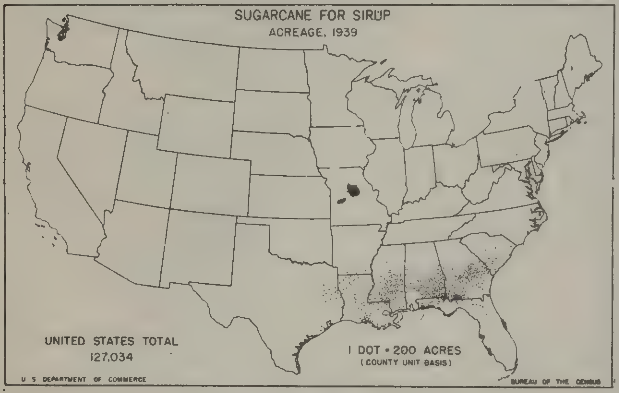
1 DOT = 1,000 ACRES
(COUNTY UNIT BASIS)

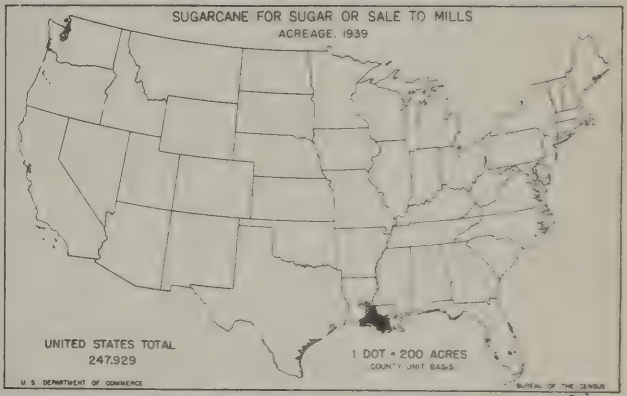
U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

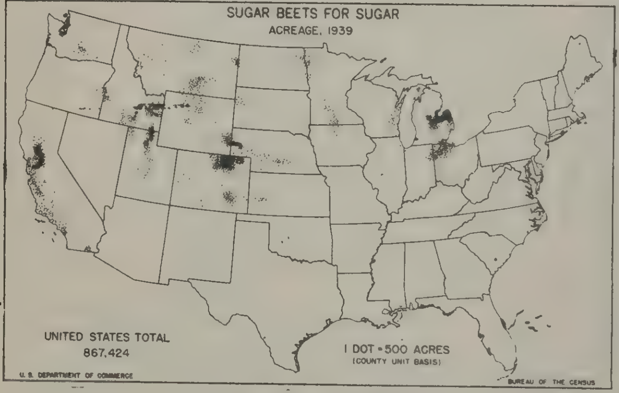
FIELD CROP DISTRIBUTION

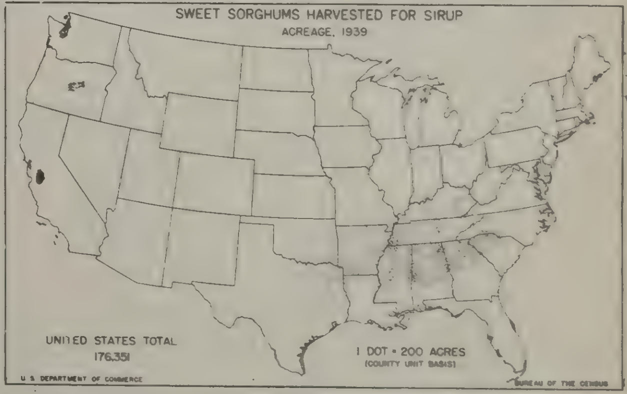


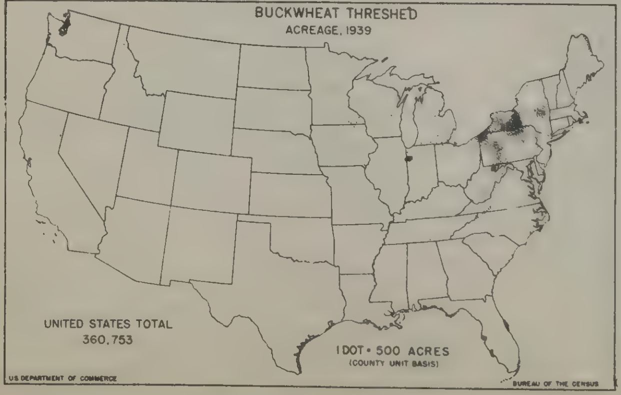


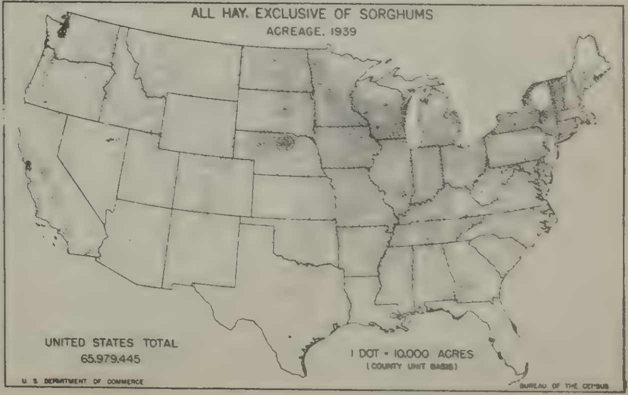






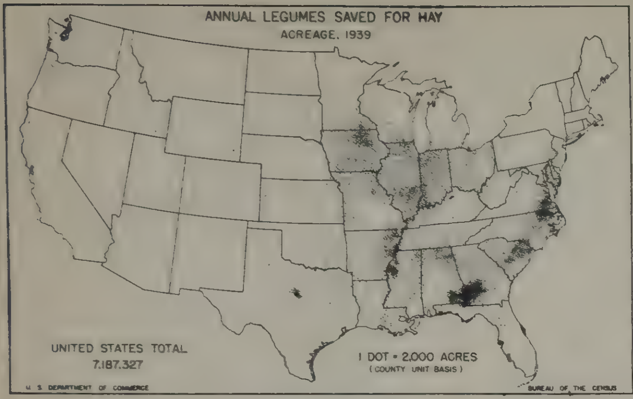






CENSUS OF AGRICULTURE: 1940

FIELD CROP DISTRIBUTION

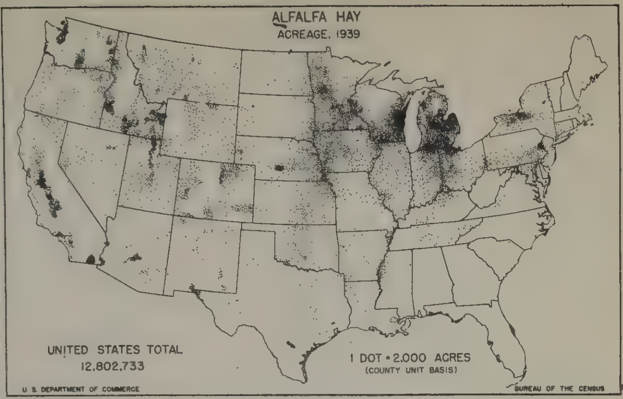


ANNUAL LEGUMES SAVED FOR HAY
ACREAGE, 1939

UNITED STATES TOTAL
7,187,327

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

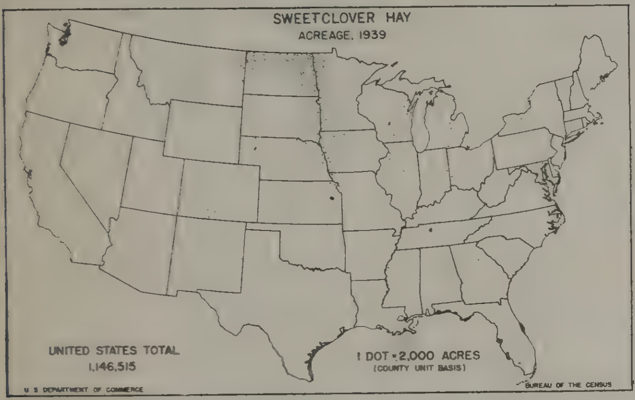


ALFALFA HAY
ACREAGE, 1939

UNITED STATES TOTAL
12,802,733

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

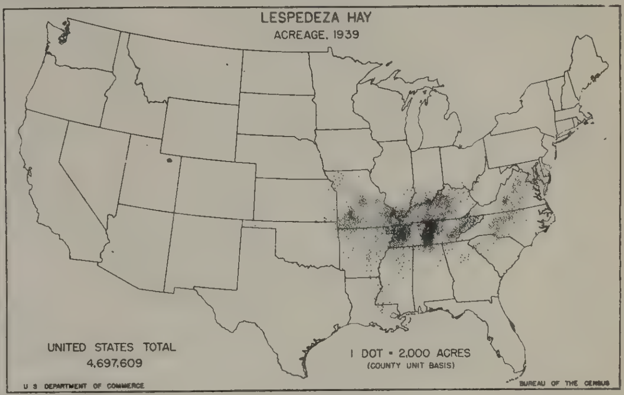


SWEETCLOVER HAY
ACREAGE, 1939

UNITED STATES TOTAL
1,146,515

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

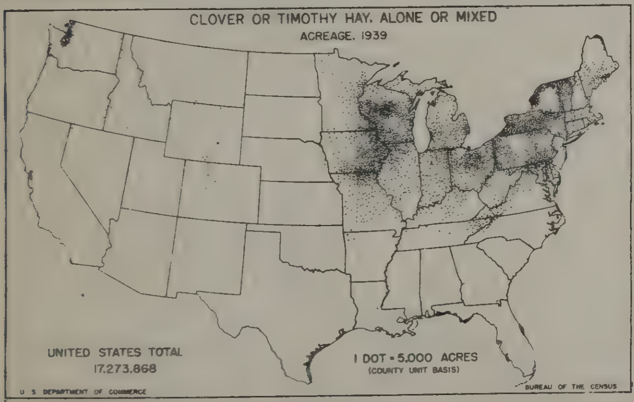


LESPEDEZA HAY
ACREAGE, 1939

UNITED STATES TOTAL
4,697,609

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

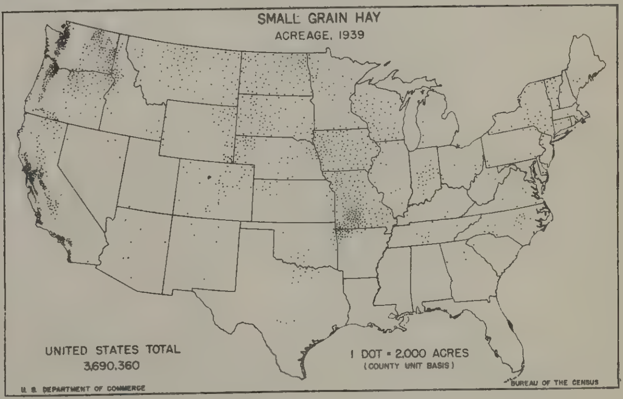


CLOVER OR TIMOTHY HAY, ALONE OR MIXED
ACREAGE, 1939

UNITED STATES TOTAL
17,273,868

1 DOT = 5,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

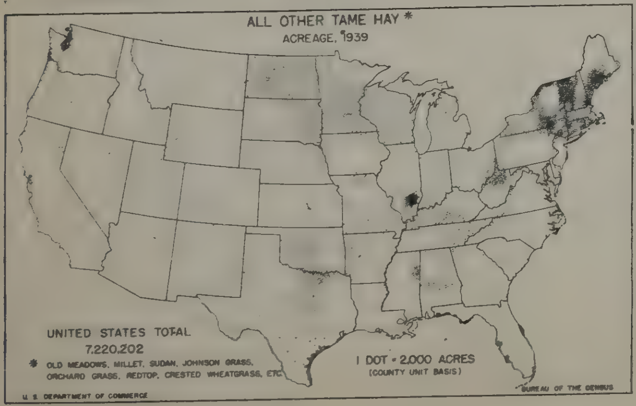


SMALL GRAIN HAY
ACREAGE, 1939

UNITED STATES TOTAL
3,690,360

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS



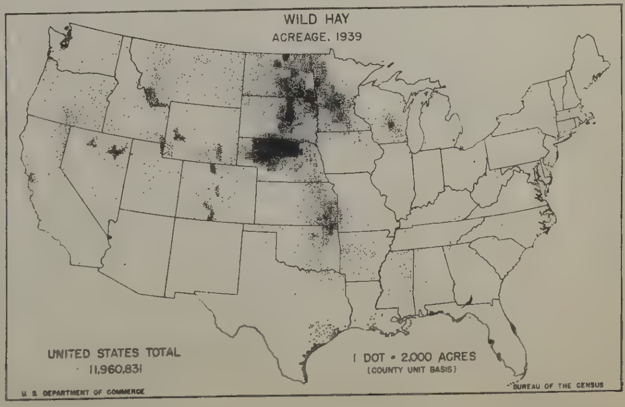
ALL OTHER TAME HAY *
ACREAGE, 1939

UNITED STATES TOTAL
7,220,202

* OLD MEADOWS, MILLET, SUDAN, JOHNSON GRASS, ORCHARD GRASS, REDTOP, CRESTED WHEATGRASS, ETC.

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS



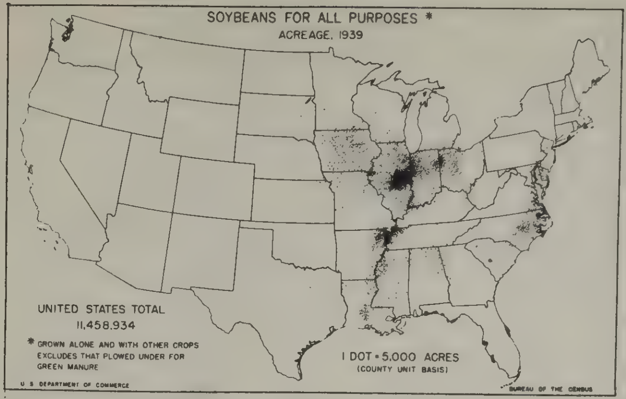
WILD HAY
ACREAGE, 1939

UNITED STATES TOTAL
11,960,831

1 DOT = 2,000 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

FIELD CROP DISTRIBUTION

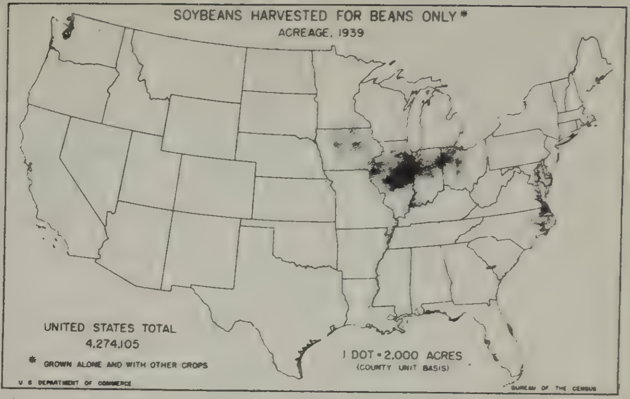

SOYBEANS FOR ALL PURPOSES *
ACREAGE, 1939

UNITED STATES TOTAL
11,458,934

* GROWN ALONE AND WITH OTHER CROPS EXCLUDES THAT PLOWED UNDER FOR GREEN MANURE

1 DOT = 5,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

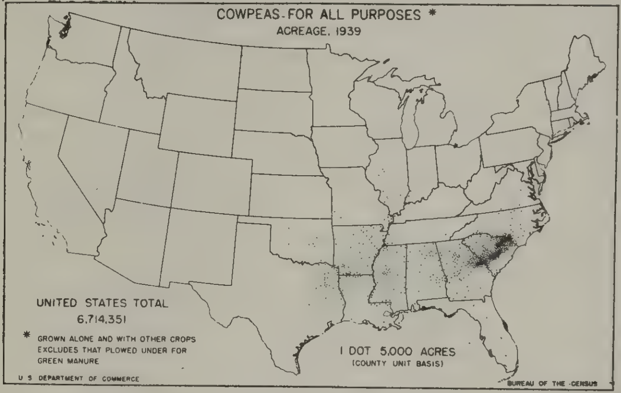

SOYBEANS HARVESTED FOR BEANS ONLY *
ACREAGE, 1939

UNITED STATES TOTAL
4,274,105

* GROWN ALONE AND WITH OTHER CROPS

1 DOT = 2,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

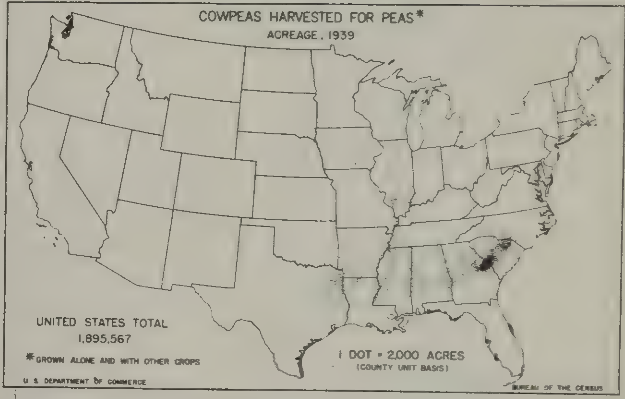

COWPEAS FOR ALL PURPOSES *
ACREAGE, 1939

UNITED STATES TOTAL
6,714,351

* GROWN ALONE AND WITH OTHER CROPS EXCLUDES THAT PLOWED UNDER FOR GREEN MANURE

1 DOT 5,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

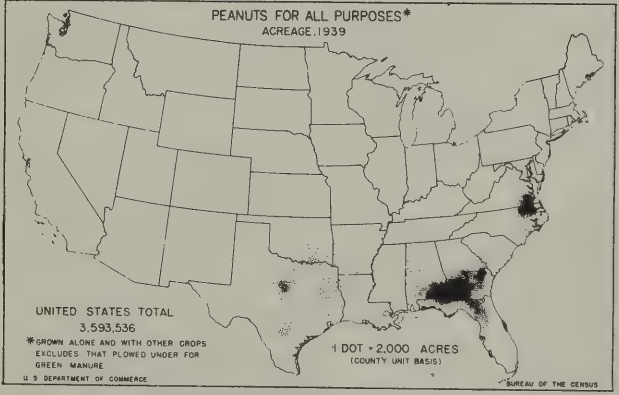

COWPEAS HARVESTED FOR PEAS *
ACREAGE, 1939

UNITED STATES TOTAL
1,895,567

* GROWN ALONE AND WITH OTHER CROPS

1 DOT = 2,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

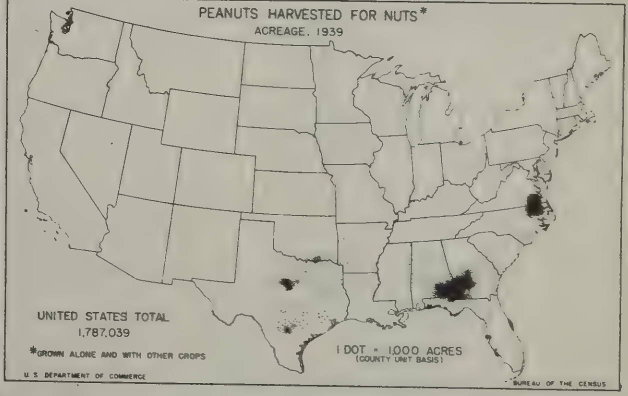

PEANUTS FOR ALL PURPOSES *
ACREAGE, 1939

UNITED STATES TOTAL
3,593,536

* GROWN ALONE AND WITH OTHER CROPS EXCLUDES THAT PLOWED UNDER FOR GREEN MANURE

1 DOT = 2,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

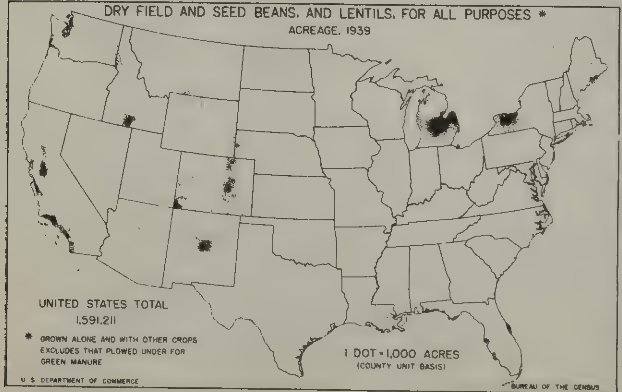

PEANUTS HARVESTED FOR NUTS *
ACREAGE, 1939

UNITED STATES TOTAL
1,787,039

* GROWN ALONE AND WITH OTHER CROPS

1 DOT = 1,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

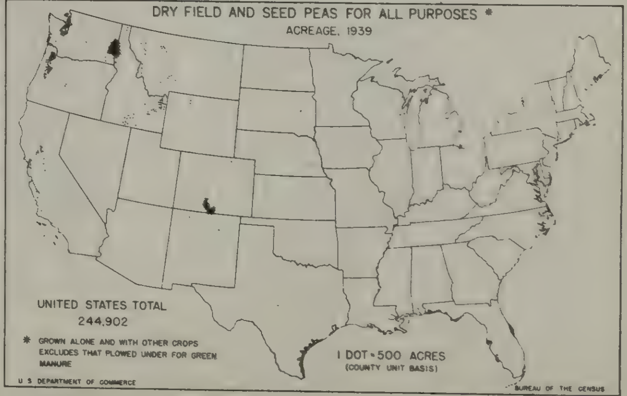

DRY FIELD AND SEED BEANS, AND LENTILS, FOR ALL PURPOSES *
ACREAGE, 1939

UNITED STATES TOTAL
1,591,211

* GROWN ALONE AND WITH OTHER CROPS EXCLUDES THAT PLOWED UNDER FOR GREEN MANURE

1 DOT = 1,000 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS


DRY FIELD AND SEED PEAS FOR ALL PURPOSES *
ACREAGE, 1939

UNITED STATES TOTAL
244,902

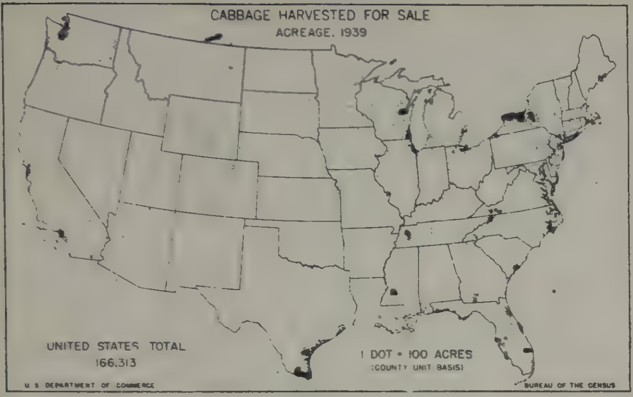
* GROWN ALONE AND WITH OTHER CROPS EXCLUDES THAT PLOWED UNDER FOR GREEN MANURE

1 DOT = 500 ACRES (COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

CENSUS OF AGRICULTURE: 1940

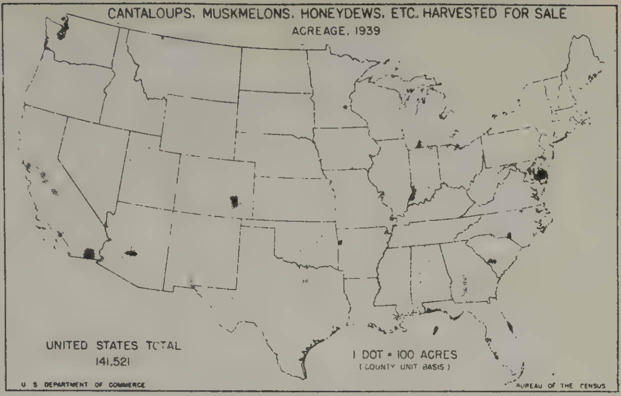
VEGETABLE CROP DISTRIBUTION


CABBAGE HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
166,313

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

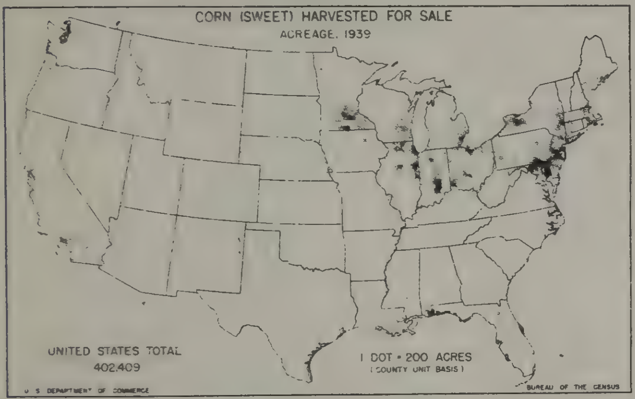
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


CANTALOUPS, MUSKMELONS, HONEYDEWS, ETC. HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
141,521

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

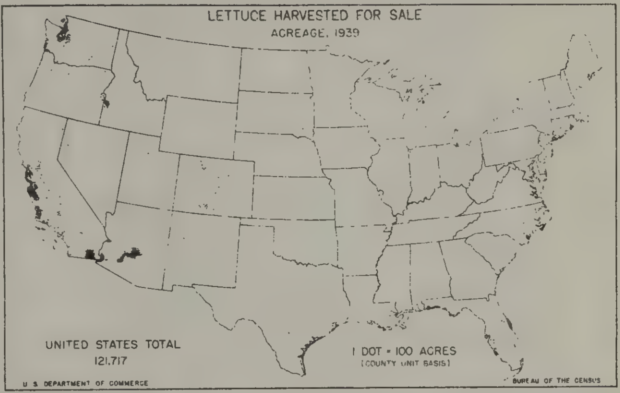
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


CORN (SWEET) HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
402,409

1 DOT = 200 ACRES
(COUNTY UNIT BASIS)

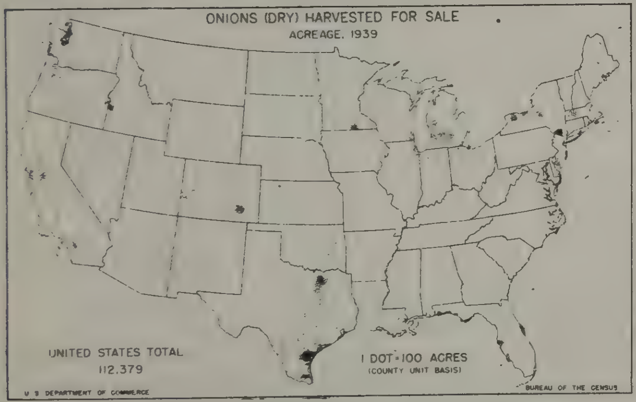
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


LETTUCE HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
121,717

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

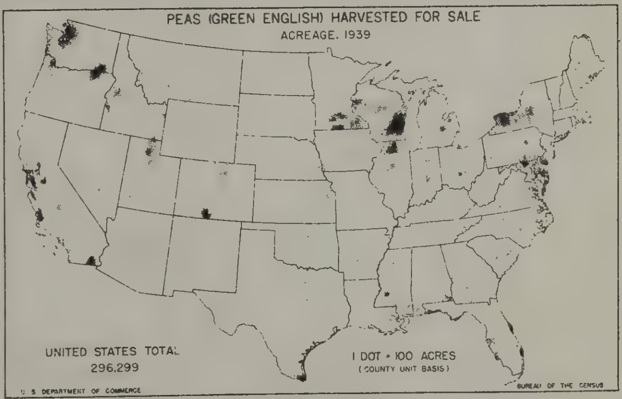
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


ONIONS (DRY) HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
112,379

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

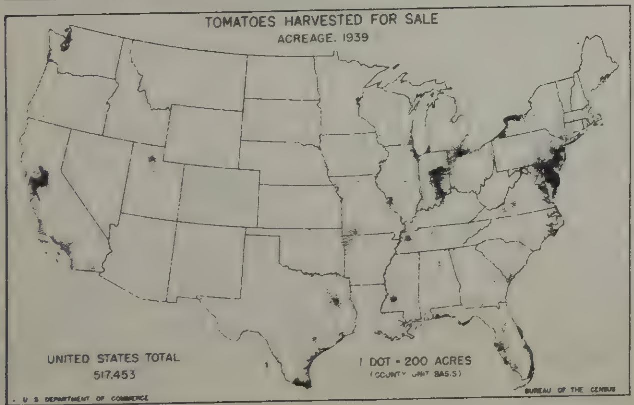
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


PEAS (GREEN ENGLISH) HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
296,299

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

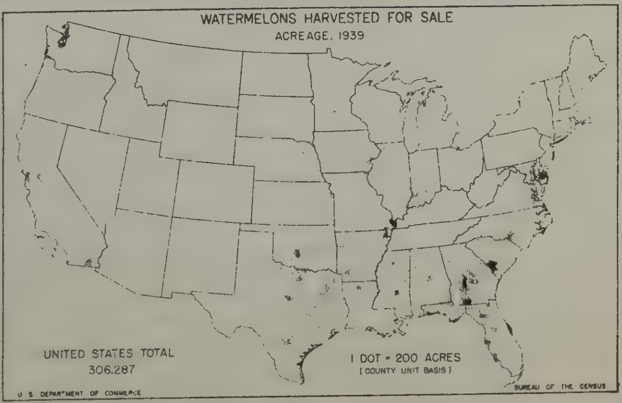
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


TOMATOES HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
517,453

1 DOT = 200 ACRES
(COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

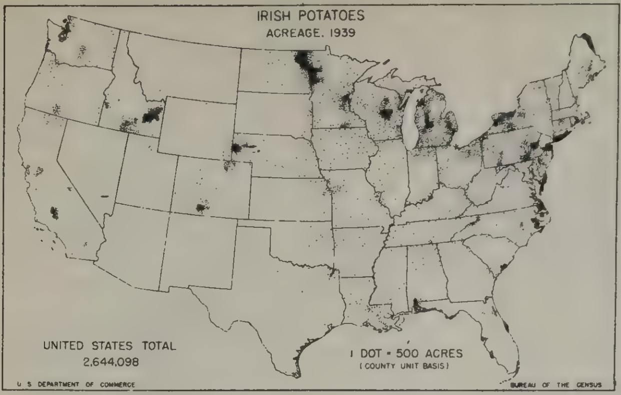

WATERMELONS HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
306,287

1 DOT = 200 ACRES
(COUNTY UNIT BASIS)

U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

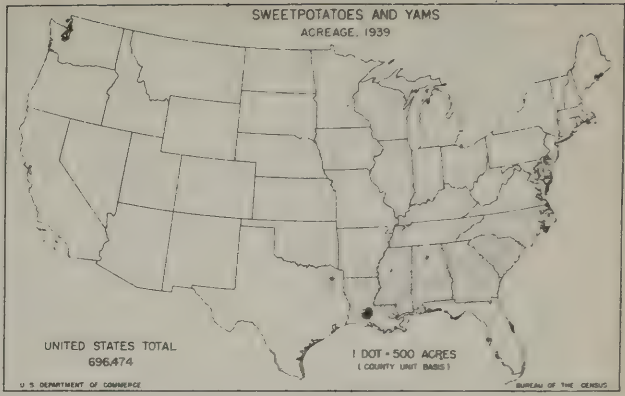
VEGETABLE CROP DISTRIBUTION


IRISH POTATOES
ACREAGE, 1939

UNITED STATES TOTAL
2,644,098

1 DOT = 500 ACRES
(COUNTY UNIT BASIS)

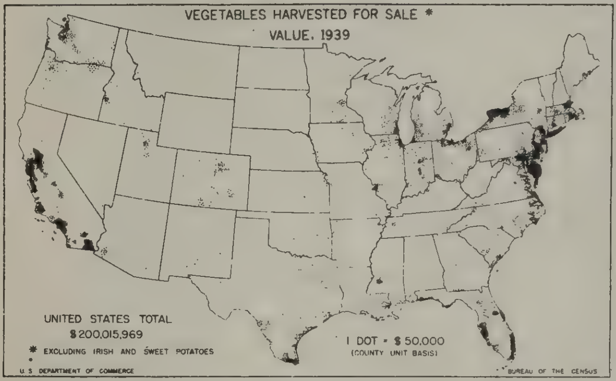
U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS


SWEETPOTATOES AND YAMS
ACREAGE, 1939

UNITED STATES TOTAL
696,474

1 DOT = 500 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

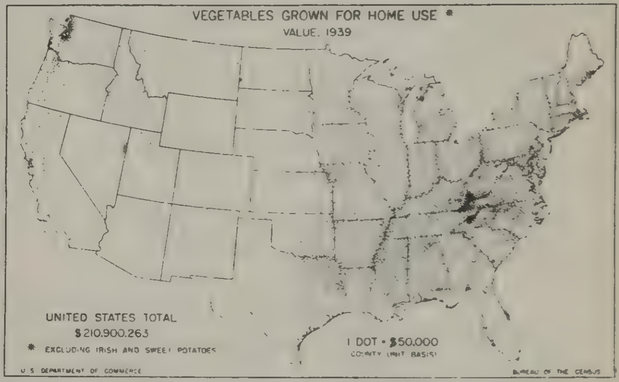

VEGETABLES HARVESTED FOR SALE *
VALUE, 1939

UNITED STATES TOTAL
$200,015,969

* EXCLUDING IRISH AND SWEET POTATOES

1 DOT = $50,000
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

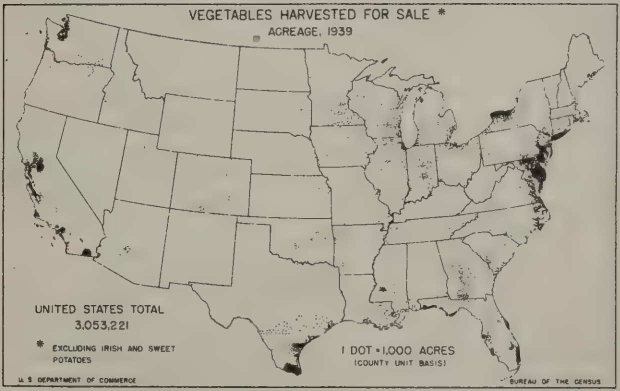

VEGETABLES GROWN FOR HOME USE *
VALUE, 1939

UNITED STATES TOTAL
$210,900,263

* EXCLUDING IRISH AND SWEET POTATOES

1 DOT = $50,000
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

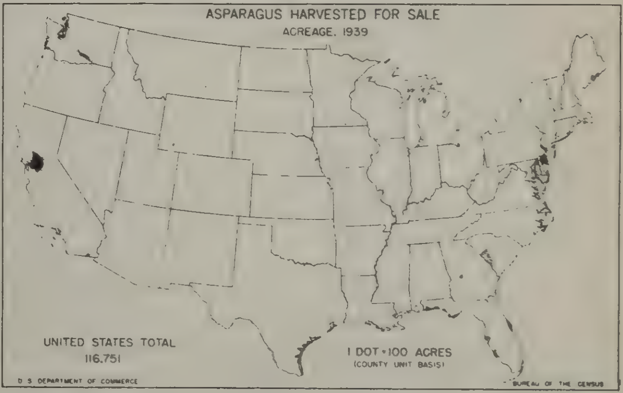

VEGETABLES HARVESTED FOR SALE *
ACREAGE, 1939

UNITED STATES TOTAL
3,053,221

* EXCLUDING IRISH AND SWEET POTATOES

1 DOT = 1,000 ACRES
(COUNTY UNIT BASIS)

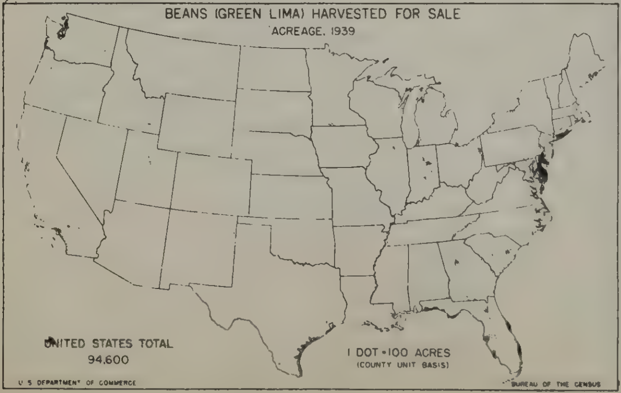
U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS


ASPARAGUS HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
116,751

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

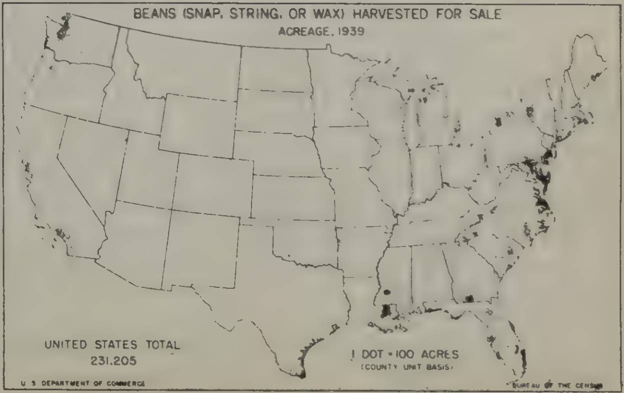
U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS


BEANS (GREEN LIMA) HARVESTED FOR SALE
ACREAGE, 1939

UNITED STATES TOTAL
94,600

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS


BEANS (SNAP, STRING, OR WAX) HARVESTED FOR SALE
ACREAGE, 1939

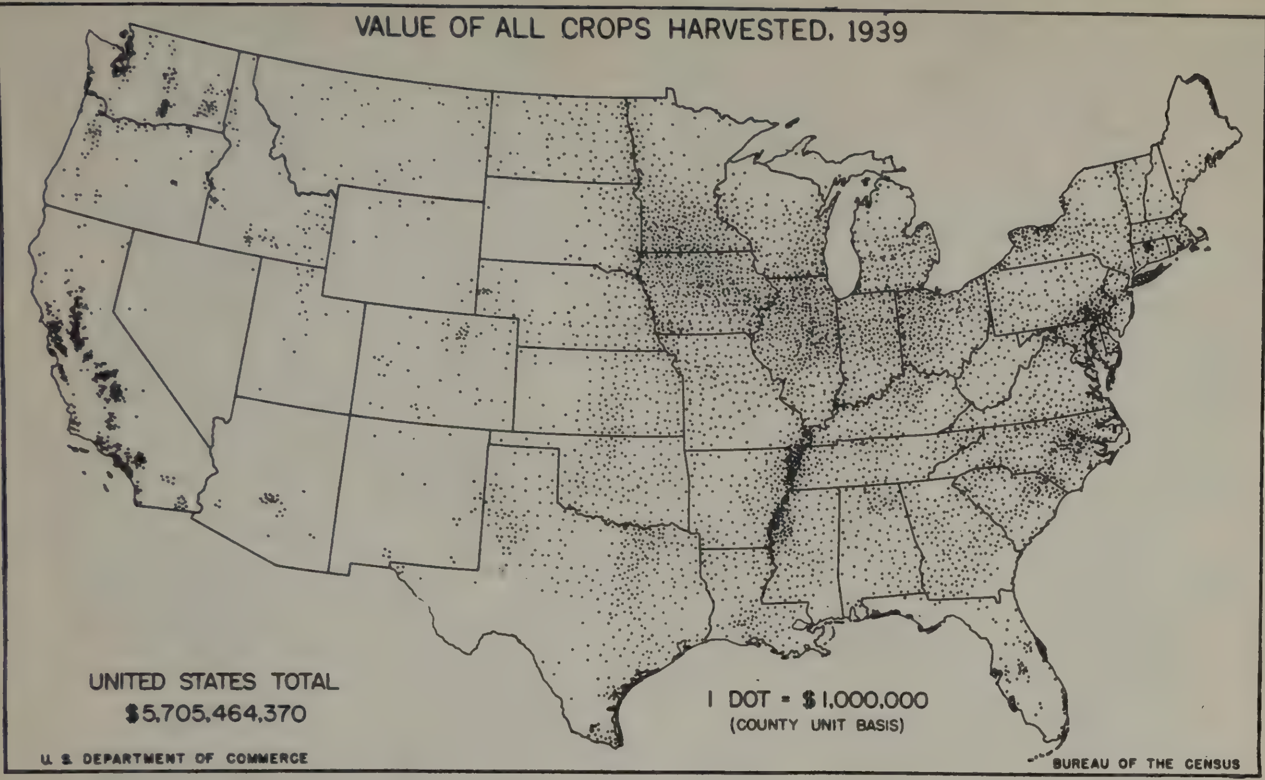
UNITED STATES TOTAL
231,205

1 DOT = 100 ACRES
(COUNTY UNIT BASIS)

U. S. DEPARTMENT OF COMMERCE — BUREAU OF THE CENSUS

CENSUS OF AGRICULTURE: 1940

CROP DISTRIBUTION



The map on this page is a composite picture of the crops and vegetable distribution maps shown in the preceding pages of this series.

The distribution of dots on this map reflects to a large degree the intensity of crop production. Soil productivity and climate are shown to the extent that they affect the intensity of crop production. Crop failures in 1939 did not have an important effect except in the winter wheat belt centering on western Kansas where extensive crop failures occurred.

The corn-belt is the largest region of intensive agriculture in the United States. Here soil conditions and climate are favorably combined for a very high type of agriculture. Transportation facilities and proximity to industrial centers are important contributing factors.

The cotton-belt is a region of intensive agriculture but crop production is limited throughout most of the area by soils of low productivity. The upper part of the Delta from central Mississippi north to the Junction of the Mississippi and Ohio Rivers stands out in sharp contrast. Here productive soils have developed from the alluvial material washed from the fertile prairies of the north. The type of farming is not on the same high plane as in the corn-belt; farming units are small, and the introduction of machinery has been slow because of the surplus farm population, cheap labor, and the difficulties encountered in developing a satisfactory cotton picker.

Intensive agricultural production on the west coast is confined largely to the irrigated valleys. Land adapted to cultivation is used very intensively for vegetables and fruit production when irrigation water is available.

CORN FACTS

Corn is the most important single crop grown in the United States. In the areas where growing conditions are favorable, it will outyield all other forage crops in dry matter and total digestible nutrients. For the past five years, 1945-49, it was planted on one out of every four acres of cropland.

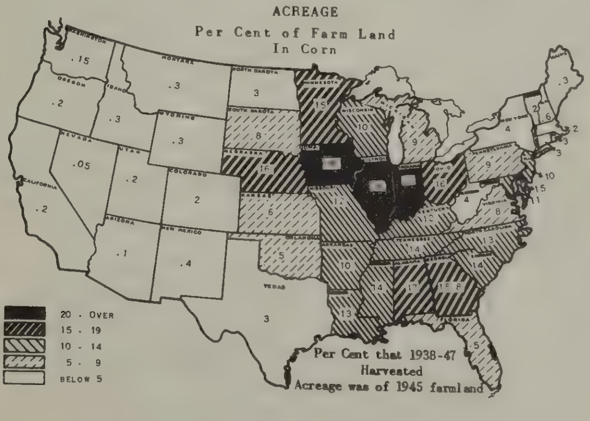
U.S. CORN PRODUCTION 1940-1950

	Acres Harvested (millions)	Yield Bushels Per Acre	Total Production (millions)	Av. Price Received By Farmers
1930-39 Av.	98.1	22.5	2,301	$ .58
1940	86.4	28.4	2,457	.62
1941	85.3	31.1	2,651	.75
1942	87.3	35.1	3,068	.92
1943	92.1	32.2	2,965	1.12
1944	94.0	32.8	3,088	1.09
1945	88.1	32.7	2,880	1.27
1946	88.5	36.7	3,249	1.56
1947	83.9	28.4	2,383	2.16
1948	86.1	42.7	3,681	1.29
1949	86.7	38.9	3,377	1.19
1950*	82.9	37.5	3,117	1.44

* Oct. 1, Estimate

The average production for the ten year period 1940-49 was 2,980 million bushels. Record production of 3.6 billion bushels was set in 1948. Lowest production in recent years was 2,383 in 1947. In the drouth year of 1934 only 1,448 million bushels were harvested.

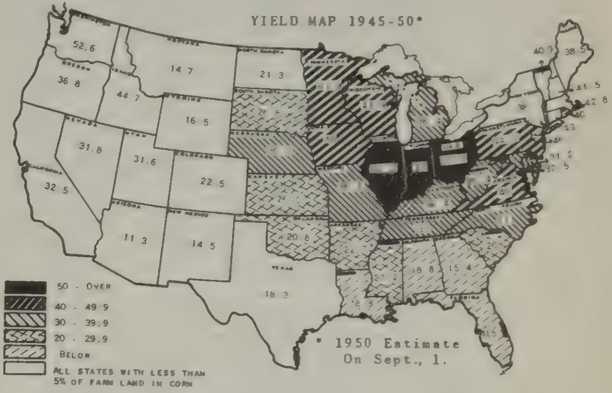
The map shows the average percentage of total land planted in corn.


ACREAGE
Per Cent of Farm Land
In Corn

Per Cent that 1938-47 Harvested Acreage was of 1945 farmland

Corn yields vary widely because of climate, weather and soil fertility. The state averages shown on the map include a wide difference in farms, weather conditions, and fertilizing practices. Good farmers produce much higher yields than the average.

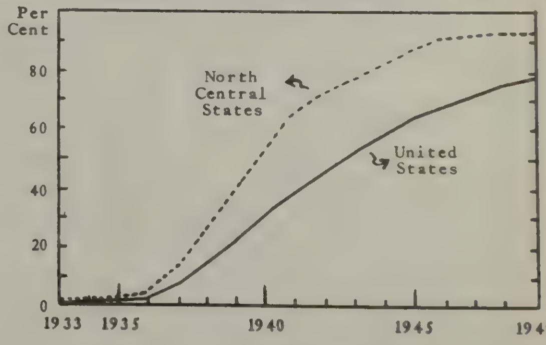
In a ten acre yield contest in 1949, an Indiana farmer produced 221 bushels per acre. With plenty of fertilizer, good soil, and adapted hybrid varieties, one hundred bushel yields are quite possible with favorable weather conditions.


YIELD MAP 1945-50*

* 1950 Estimate On Sept., 1.

Hybrid seed, along with good management, mechanization and more extensive use of fertilizer, are responsible for higher yields in recent years. Commercial hybrid seed corn was first produced in Connecticut in 1922. Hybrids adapted to the Corn Belt became available in 1929. Acceptance of hybrids by Corn Belt farmers has been rapid -- because commercial companies have made adapted varieties of seed available for this area. Over 99 per cent of all the corn raised in Iowa, Illinois and Indiana was produced from hybrid seed in 1949. Yields are increased about 20 per cent by using adapted hybrid seed instead of open-pollinated varieties.

PERCENTAGE OF TOTAL CORN ACREAGE PLANTED WITH HYBRID SEED, 1933-1949



Hybrid seed production has become big business in recent years. A major cost in seed growing is the detasseling of the female inbreds. Plant breeders at the Illinois Experiment station are now working with a new drug, maleic hydrazide, to develop a sterile inbred strain which would eliminate all the labor of detasseling.

DOANE AGRICULTURAL DIGEST ® OCT., 1950

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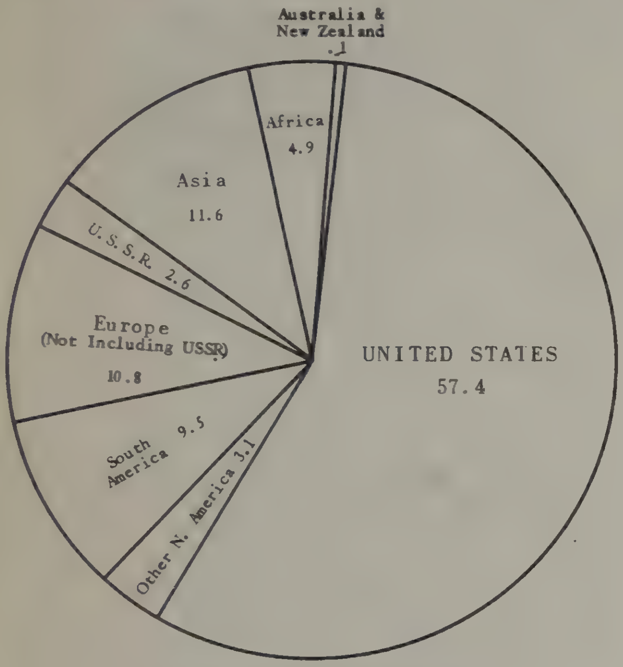
CORN FACTS

WORLD CORN PRODUCTION

Corn was first discovered in Cuba during Columbus' first exploration in 1492. It was an unknown crop in the European world until that time. Although the United States produces 57.4 per cent of the total world production, corn is now grown in many other parts of the world. World production averaged 5,383 million bushels annually from 1946-48.



WORLD CORN PRODUCTION
Per Cent Of Total By Countries, 1946-1948 Av.

USES OF CORN

About 85 per cent of annual U.S. corn crop was fed to livestock in the five year period 1943-47. Wet process products such as sugar, starch, and syrup used 3.9 per cent of the crop. Dry processing for breakfast food, corn meal, and other uses took one per cent. Alcohol and distilled spirits also used one per cent. Exports averaged 1.2 per cent, and seed required .4 per cent. Average carryover was 7.2 per cent.

The largest proportion of our corn crop is harvested for grain only. But, corn for silage and hogging down is also important. In 1948, 4 million acres produced 35.6 million tons of silage and 3.5 million acres were hogged down or grazed. Hogs, turned into the fields when the crop is mature, will harvest corn with little waste and save hours of labor to pick, haul, and crib it.

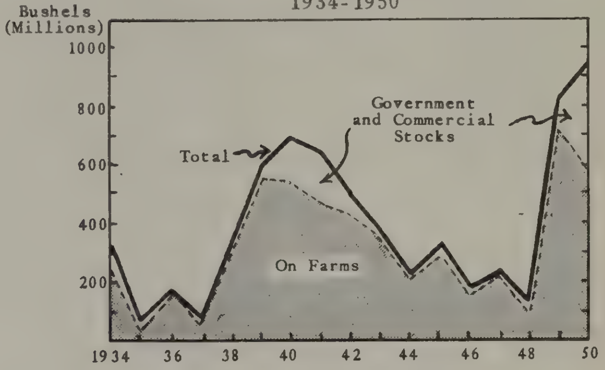
Corn fodder consists of the whole stalks with the ears left on. Corn stover is the fodder with ears removed.

CORN AND GOVERNMENT PROGRAMS

Corn is one of the six basic commodities defined by the Agricultural Adjustment Acts of 1938, 1948, and 1949. Since the war, it has been supported at 90 per cent of parity through loans and purchase agreements. See page 27.

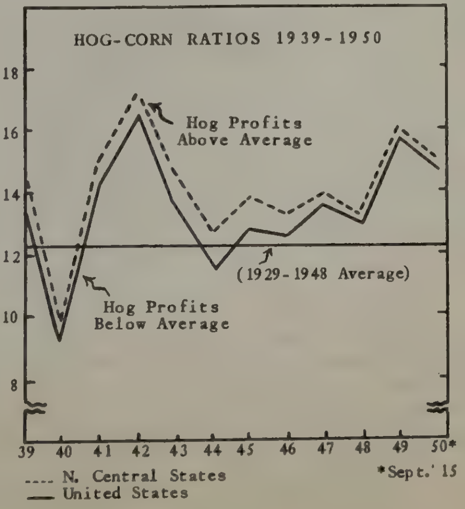
Unusually large crops in 1948 and 1949 along with high support prices encouraged many farmers to sell their corn through a government loan instead of feeding it to livestock. As a result, October 1, 1950 carryover was at a record level. Although a "burdensome surplus" before the Korean situation, these huge stocks of corn are now considered a valuable asset to our defense program.

OCTOBER 1 CARRYOVER OF CORN
1934-1950



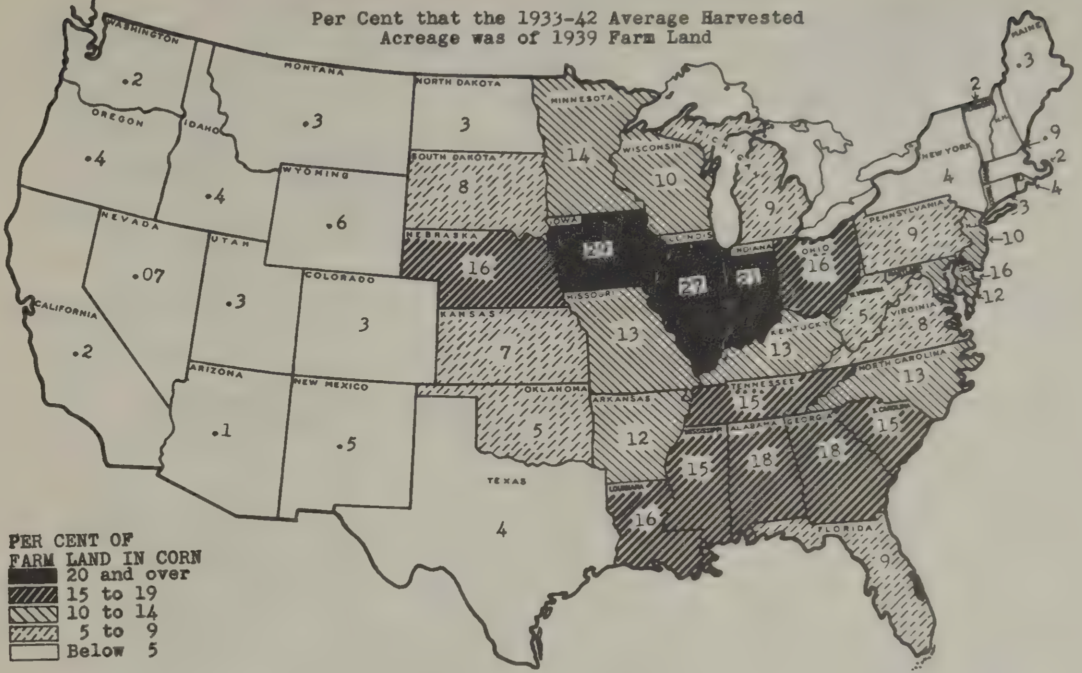
HOG-CORN RATIO

The hog-corn ratio is the number of bushels of corn equal in value to 100 pounds of live hog. The average hog-corn ratio in the United States from 1929-48 was 12.3. Hog feeding becomes more profitable as the ratio rises above the average. The North Central states have a more favorable ratio because of higher corn production and lower prices.



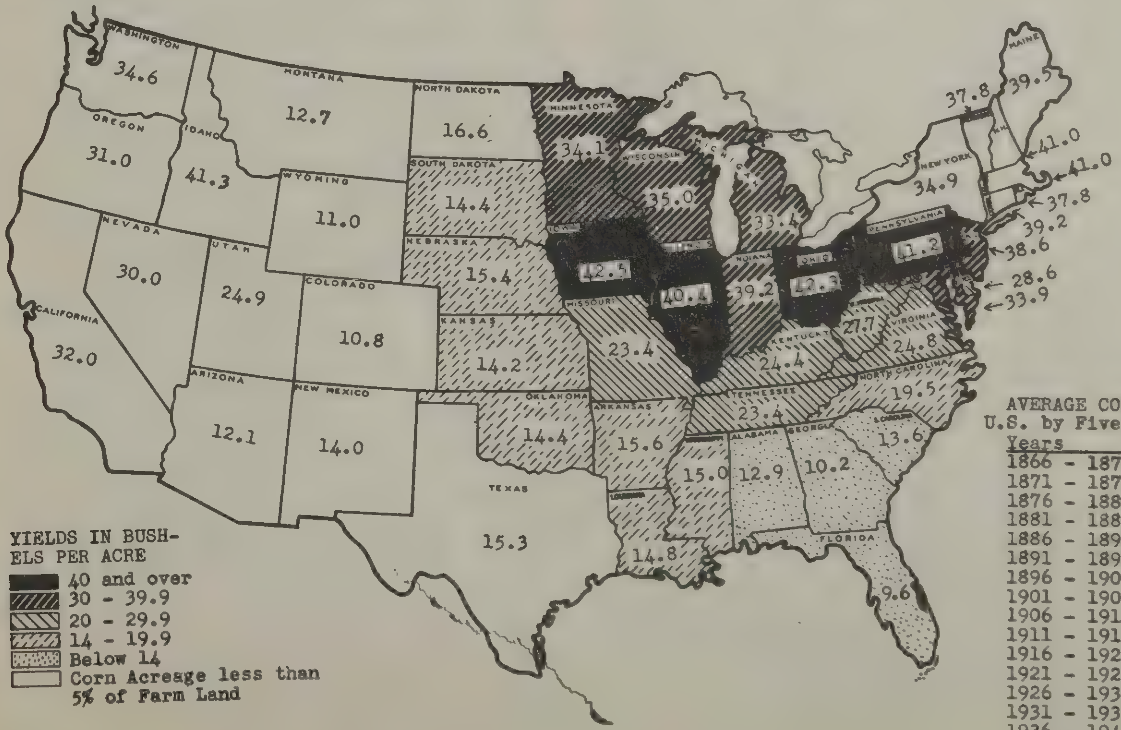
CORN

ACREAGE- Per cent of Farm Land in Corn



Per Cent that the 1933-42 Average Harvested Acreage was of 1939 Farm Land

YIELDS- Average for 1933-42

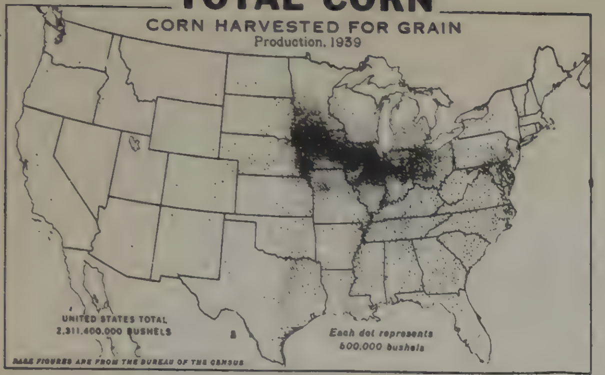


AVERAGE CORN YIELDS
U.S. by Five Year Periods

Years	Yield Bu.
1866 - 1870	25.26
1871 - 1875	25.88
1876 - 1880	26.84
1881 - 1885	25.48
1886 - 1890	25.34
1891 - 1895	25.26
1896 - 1900	27.66
1901 - 1905	26.54
1906 - 1910	27.96
1911 - 1915	26.02
1916 - 1920	26.36
1921 - 1925	26.70
1926 - 1930	25.02
1931 - 1935	22.60
1936 - 1940	25.92
1941 - 1944	32.87

Based on Data of U.S.D.A.

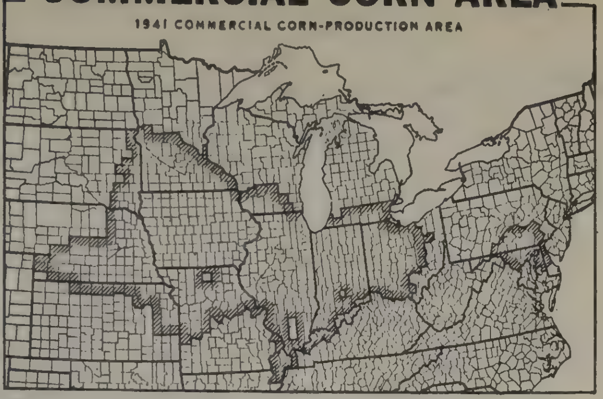
TOTAL CORN



BAE 38848

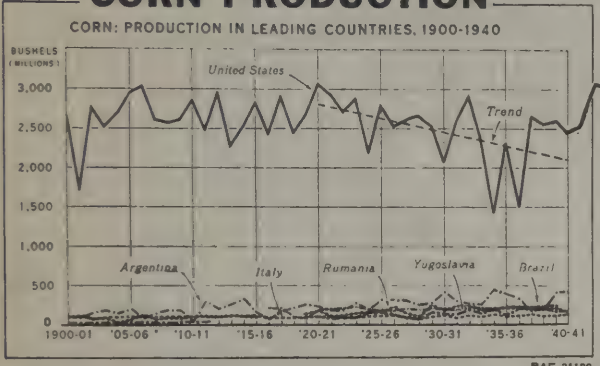
The production of corn for grain is concentrated in the Corn Belt. About 40 percent of the corn crop of the United States is used as feed for hogs; and probably 50 percent is used on farms as feed for cattle, sheep, horses, and mules, and for other farm uses. Corn is also used industrially in five principal fields—milling or dry processing, cereal manufacturing, wet milling or corn refining, manufacturing of Ethyl alcohol and beverages, and manufacturing of Butyl alcohol and acetone.

COMMERCIAL CORN AREA



The commercial corn-producing area shown within the shaded outline in the map includes all counties in which the average production of corn is 450 bushels or more per farm and 4 bushels or more for each acre of farm land in the county.

CORN PRODUCTION



BAE 31188

The United States is the largest corn-producing country in the World. .... over 50 percent of the world total. From 1920 to 1940 the trend of corn production in the United States has been downward, whereas production in foreign countries has increased slightly. However, hybrid corn has had a tendency to maintain higher yields, whereas acreage has been lower.

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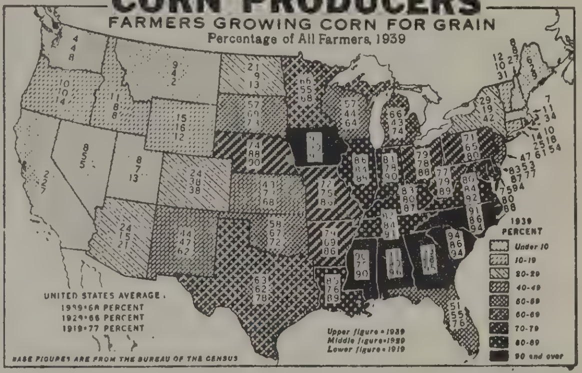
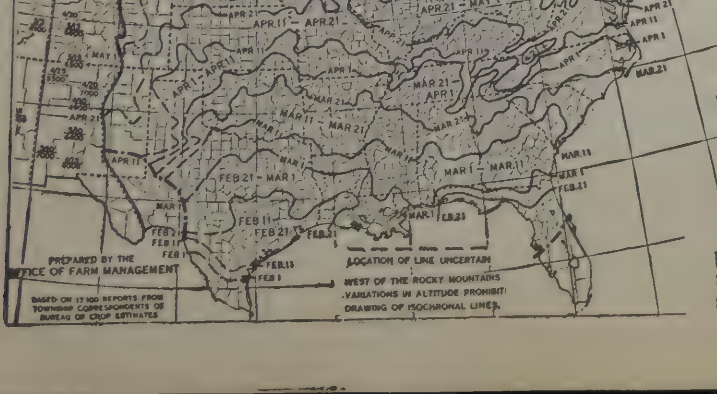
CORN PRODUCERS



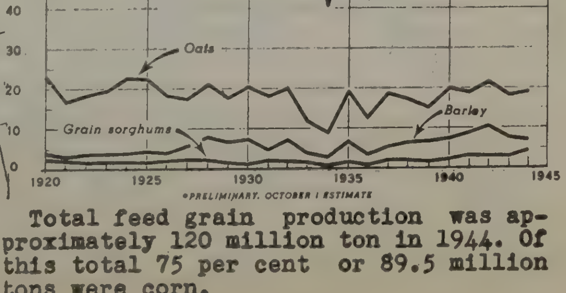
BAGE 4206

In 1939 corn was grown by over two-thirds of all the farmers in the United States. Heavy decreases in the number of farmers growing corn occurred in the Great Plains States of South Dakota, Nebraska, Colorado, Kansas, and Oklahoma, from 1919 to 1939, due partly to shifts to more drought-resistant feed crops and replacement of grass on a considerable acreage of intertilled soils. The largest portion of all farmers growing corn occurs in the Cotton Belt, where production of corn per acre is light, but where more and more farmers are growing their own feed. Over 90 percent of all farmers in the eastern Cotton Belt States grew corn in 1939, whereas only 86 percent of the farmers grew corn in Illinois, in the heart of the Corn Belt.

CORN PLANTING DATES


CORN
DATE WHEN PLANTING BEGINS
MAY 11
AFTER MAY 11
MAY 1
MAY 5-20
APR 21
APR 11
APR 1
MAR 21
MAR 11
MAR 1
FEB 21 - MAR 1
FEB 11
FEB 21
FEB 1
PREPARED BY THE OFFICE OF FARM MANAGEMENT
BASED ON 17,100 REPORTS FROM TOWNSHIP CORRESPONDENTS OF BUREAU OF CROP ESTIMATES
LOCATION OF LINE UNCERTAIN
WEST OF THE ROCKY MOUNTAINS VARIATIONS IN ALTITUDE PROHIBIT DRAWING OF ISOCHRONAL LINES.

FEED CROPS

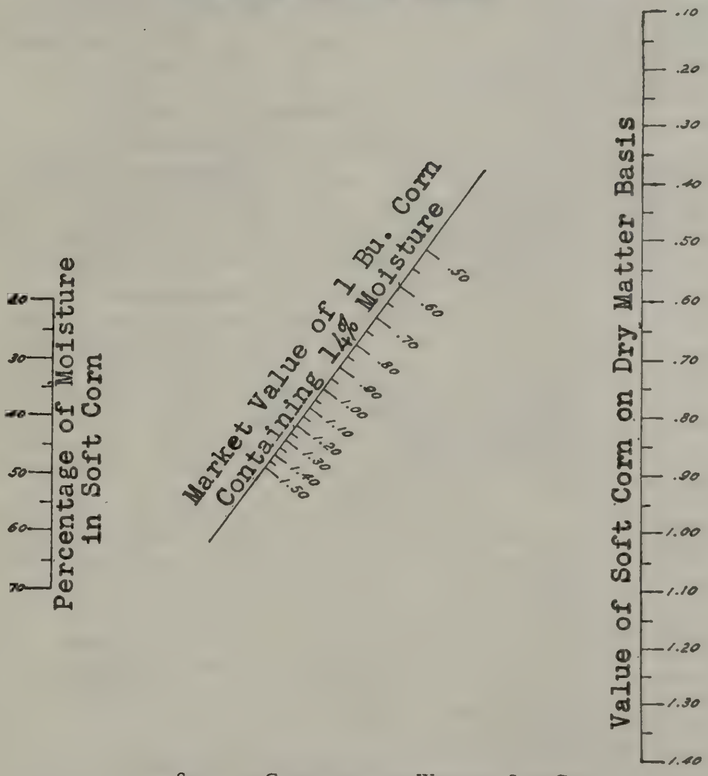


Total feed grain production was approximately 120 million ton in 1944. Of this total 75 per cent or 89.5 million tons were corn.

FEEDING SOFT CORN

There should be no hesitation about feeding soft corn when it is in good condition, but its feeding value should not be overestimated. Those with soft corn on their hands can get some idea of the feeding value of it by using the chart , which has been designed to aid in the rapid calculation of the worth of soft corn on the basis of its dry-matter content as compared with No. 1 corn at prices ranging from 50 cents to $1.50 a bushel.

CALCULATION OF VALUE OF SOFT CORN
ON DRY MATTER BASIS



Scale for Calculating the Worth of Soft Corn

By using this scale it is possible to determine the worth of soft corn, on the basis of its dry-matter content, as compared with No. 1 corn.

Before the chart can be used, however, it is necessary to know the percentage of water in the corn in question. Elevators usually have the necessary equipment for determining this percentage, and there should be no trouble in making the calculation.

After the moisture content of the corn is known, the relative value of it, which will be an indicator of its feeding value, can be determined by placing a ruler (transparent if available) on the page in such a way that it will connect a point on the left-hand perpendicular, where the moisture content of the corn is shown, and a point on the inclined line, where the prevailing price of No. 1 corn is shown. The highest value that can be placed on the soft corn without making the dry matter in it cost more a pound than the dry matter in No. 1 corn will be shown at the point where the ruler intersects the right-hand perpendicular.

It should be pointed out that this figure is not necessarily the price at which the soft corn in question *could* be sold. From a practical standpoint this figure might be greatly reduced, because of factors other than moisture content, such as spoilage that has occurred or the risk of spoilage in storage. University of Illinois,

It is highly important that any landlord who faces prospects of soft corn not wait until the last minute to work out with the tenant details of handling the soft corn in case of an early frost. Working out these details early places the landlord in a position to put them into immediate operation should an early frost hit the corn crop.

Because of its high moisture content, soft corn is better "cattle feed" than "hog feed." To get the greatest feeding value from soft corn, the entire plant must be cut. This means that the best method of salvaging a field of late corn is through the silo, with fodder a close second. Third in line, is to snap the ears, then put them in the silo.

A landlord who has soft corn has only about two alternatives: (1) Sell the corn in the field or after it is harvested, or (2) feed some cattle himself.

Selling his share in the field is probably the best out for the landlord who "inherits" a soft corn crop, particularly where little or none of it is merchantable corn. In this connection it is well to remember that on farms where there is considerable soft corn, the tenant may not have the incentive to take on additional feeding operations to utilize the landlord's share. Furthermore, the buyer's opportunities for utilizing soft corn are more limited than with a normal crop. In many cases the buyer is really helping the landlord by taking off his hands a crop that is not very merchantable.

Where the tenant has the ability to feed cattle, the landlord may desire to market his soft corn through a cooperative feeding program with the tenant. In such a case, the cost of providing a picket fence or trench silo, if necessary, probably would be borne by the landlord. The tenant probably would put up the soft corn and care for the cattle. Cost of the tractor and ensilage cutter, other feed costs and the original cost of cattle would be divided equally between landlord and tenant. The profits then would be split equally.
Iowa State College

SOFT CORN

In general, corn is considered "soft" if because of high water content the ears will not keep when stored. Since corn which contains around 20 to 25 per cent water may be satisfactorily cribbed, corn containing 35 per cent water may be considered as "fairly soft", that containing 45 per cent water as "soft", while corn which is 50 per cent or more water would be considered "very soft".

In order to estimate the moisture content of soft corn the following figures should be helpful. In general, data secured by the Field Crops Department of the Missouri Station show that corn in the roasting ear stage contains about 65 per cent water; hard roasting ear 50 per cent; beginning to dent 40 per cent; and well dented corn 35 per cent.

Feeding Value

Experiments indicate that the dry matter in soft corn is as valuable as the same amount of dry matter in mature corn. In other words, as a rule 100 pounds of dry matter in soft corn which is not moldy or otherwise damaged, may be considered equal in feeding value to 100 pounds of dry matter in mature corn. In order to determine the feeding value of soft corn, therefore, it is important to carefully estimate the moisture content.

No. 2 dent corn contains on the average about 15 per cent moisture. Since it is customary to figure that a bushel of such corn weighs 70 pounds, then the following weights of corn would need to be used in order to have feeding value equal to a bushel of No. 2. corn.

Amount moisture	Weight per bushel
15%	70 lbs.
20%	75 lbs.
25%	80 lbs.
30%	85 lbs.
35%	92 lbs.
40%	100 lbs.
45%	108 lbs.
50%	120 lbs.
55%	132 lbs.
60%	149 lbs.
65%	170 lbs.

Horses—Soft corn should seldom, if ever, be fed to horses, since, even if well preserved, digestive disturbances may follow its use. If no other grain is available and the feeder is forced to take such risk, the hardest ears should be selected from the most mature corn available and then fed with extreme caution, being very careful to avoid using any moldy or ears otherwise not in good condition.

Sheep—The statements regarding soft corn for feeding horses will also apply in the case of young sheep. Older sheep may utilize some soft corn although it will usually be more practical to make the ration of older sheep on the farm consist of roughage and pasture rather than grain.

Hogs—Corn which would classify as "fairly soft" can be utilized to good advantage for feeding all kinds of hogs. Fattening hogs may not gain as rapidly as on mature corn since it is sometimes difficult for the hogs to eat enough to get an equal amount of dry matter from the soft product. Under such conditions self feeding, with proper management, will probably give best results or, if not self fed, the corn should be offered the animals at more frequent intervals than is ordinarily done if maximum gains are desired. Experiments with soft corn for fattening swine at the Iowa Experiment Station indicate that somewhat more protein supplement such as tankage is needed when the corn is soft than when mature corn is fed. Gains will also be more rapid if some mature corn or some ground wheat is fed along with the soft grain.

Corn which contains as much as 50 per cent or more water does not make a very satisfactory hog feed. Fattening hogs cannot consume it in sufficient amounts to get enough dry matter, and when given all they will eat, have a tendency to scour which indicates digestive disturbances. The same is more or less true of young pigs. Under such conditions some additional dry feed is especially needed. Older stock pigs and mature breeding animals which would ordinarily not be fed a full feed will doubtless handle extremely soft corn to better advantage than any other class of swine.

Cattle—Cattle can utilize soft corn to better advantage than any other kind of livestock. The Illinois Experiment Station has conducted extensive experiments on feeding soft corn to beef cattle and Professor H. P. Rusk of that institution summarizes some of the results as follows:

"The conversion of soft corn into ear-corn silage has proved the most effective method of utilizing such corn for beef-cattle feeding. This conclusion is based on the results of several long and short feeding trials with steers ranging from 400-pound calves to 1000-pound steers, as well as on the physical appearance of the silage and its chemical composition.

More Protein Needed with Soft Corn

Feeding trials in Iowa indicate the advisability of using more protein supplements with soft corn than is necessary for best results with mature corn. In one trial where self-feeders were used in comparing soft corn and tankage with mature corn and tankage, the hogs receiving soft corn ate 50 percent more tankage than those receiving mature corn.

A safe rule is to feed a little more than would be used with the same class of live stock receiving mature corn.

STORING SOFT CORN.

Silo Solves Storage Problem

Live-stock feeders agree that the best plan for storing soft corn is to put it in the silo. Farmers who do not have enough silo capacity to handle all their corn crop in this way can save the most valuable part of it by making silage out of the ears. Silos also can be used for storing and drying ear corn for commercial use, as will be described later.

Cheapest to Dry Ear Corn in the Field

Grain that is cribbed will not be safe from spoilage until the water content in it has dropped to 25 percent or less. The cheapest and best way to dry it out this much is to leave it in the field on the standing stalk. This method of handling soft corn is highly recommended in northern states. In fact, unless the corn is so immature that the silo would be the only practical means of handling the crop, it may be wise for those who intend to feed their grain to avoid the storage question entirely and let the corn stand in the field until it is needed in the feed lot, or else hog it down in the field.

In line with the plan of leaving soft corn in the field on the standing stalk, the Minnesota Experiment Station recommends that the crop be cut and put into small shocks when the ears have reached the milk stage. One advantage in doing this is that the shocked corn can be used during the late winter to fill silos for a second time, thereby doubling the yearly capacity of available silos. This may be a highly profitable practice in case of an emergency. Silage made from shocked corn is not so valuable as that made at the usual time, but is to be preferred over spoiled corn a little later in the season. When silage is made from shocked corn, from three-fourths to one pound of water must be added for every pound of corn.

Crib Drying May Be Necessary

On some farms it may not be possible to leave the corn in the field until it has dried out enough to be safe for storage. When this is the case, the excess moisture must be removed, either by natural ventilation or by forced air circulation, with or without heat, after the grain has been cribbed.

Crib Ventilators Aid Drying

Ventilators built from floor to ceiling thru the center of a large crib, which take air from the ends of the crib and the drag trench under it, virtually make two narrow cribs and are very effective in drying out corn.

A-Shaped Ventilator Is Good Type

An A-shaped ventilator not only is giving satisfactory results in Illinois but also is being used with success in some of the other corn-belt states. The chief point to keep in mind in building such a ventilator is to build it high enough so that the distance thru the corn is about the same at all points.

Artificial heat can be used with such a ventilator to hasten the drying of the corn. The heater or stove can be placed outside the crib and the heat brought in thru the end of the ventilator, or the heater placed right in the ventilator.

For rapid drying, artificial forced heat is much better than either natural ventilation or aeration.

SOFT CORN -- SILOS

Soft or high-moisture corn is generally a result of late maturing. In the central part of the Corn Belt, for example, corn should be mature (that is, at the point where growth stops) by about September 15 to 20 if the necessary additional drying is to take place in the field before time to harvest. When corn does not reach maturity until October, the cooler weather slows the drying rate and the time left is usually not sufficient for proper drying in the field. Regardless of the cause of the high moisture content, some spoilage is to be expected if ear corn is cribbed in the ordinary way and if the kernels contain more than 20 percent moisture. The higher the moisture content the greater the difficulty of storage.

TESTING MOISTURE CONTENT

The best way to determine the condition of the corn is to test the moisture content of field samples. In many parts of the Corn Belt local grain elevators and county offices of the Agricultural Adjustment Agency are equipped for testing the percentage of moisture in shelled corn. Since some ears will be more mature than others, the results of tests may be misleading unless care is taken to get representative samples, at least 2 of which should be taken from the same field. To obtain 1 sample, at least 20 ears should be picked at random in the field, and with a screw driver 2 rows of kernels should be shelled from each. The shelled corn should be sealed up at once in a pint fruit jar, which should be full or nearly full.

HANDLING SOFT CORN

FEEDING

Immature corn has about the same feeding value per pound of dry matter as mature corn, and as long as it remains sound it can be fed safely to all kinds of stock. This feeding should be begun carefully, however, the quantity being increased gradually to full feed. Caution needs to be exercised in feeding soft corn to poultry. Moldy corn should not be fed to horses and sheep, especially lambs; they are susceptible to injury from such feed. It can safely be fed to cattle, as seemingly they are not so subject to this danger, and also to hogs as long as they will eat it. Prompt feeding unquestionably is the best disposition to make of immature corn, so far as this is practicable. As in feeding sound corn or other grains, protein and mineral supplements should be provided.

Hogging down soft corn is a safe and satisfactory practice, but the hogs must be accustomed to it very gradually. Only a little should be fed at first and the quantity increased gradually to full feed, when the hogs may be turned into the field. Since there is a tendency for greater wastage of feed in hogging down soft corn, it is a good practice to make the hogs clean up successive strips of the cornfield by the use of temporary fences.

ENSILING

Ensiling is one of the best means of saving soft corn. If there is not enough capacity in permanent silos, temporary silos may be used. Trench, snow-fence, and stack silos are described in Farmers' Bulletin 1820, Silo Types and Construction, and in numerous publications of the State agricultural colleges. (See Page 119.3)

The whole corn plant can be safely made into silage while immature or very immature. Although such silage is not so valuable as that from more mature corn, because of its high water content and lower feeding value, it makes a satisfactory feed for cattle, and this is one of the best uses for it. Good silage can also be made from corn that has been frozen; after it has been frozen, however, it should be put into the silo as promptly as possible.

EAR-CORN SILAGE

In many instances, ensiling may be a practical method of saving ear corn that is too soft for safe storage in cribs. In making snapped or husked ear corn into silage the same principles apply as in making whole-plant silage. The ears may be chopped in an ensilage cutter. The chopped material must be packed sufficiently to exclude air. Usually it will be necessary to add water, the quantity depending upon the condition of the corn, but there should be enough to bring the moisture content up to at least 50 percent, and preferably to 60 percent. If the ears have dried down to 40 percent moisture, it will be necessary to add 1,000 pounds of water to each ton of ears to bring the moisture content up to 60 percent.

If possible, a small-diameter silo should be used for ear-corn silage since it is a more concentrated feed than whole-plant silage. The quantity fed per animal per day will be smaller, and a larger number of animals should be fed from a silo of given diameter to avoid surface spoilage of corn in the silo. Also, ear-corn silage is heavier than whole-plant silage, and extra steel reinforcing may be needed if the silo is filled full.

CUTTING AND SHOCKING

Shocking may save a part of a poorly matured crop. Under ordinary conditions in the Corn Belt nearly mature corn can stay in small shocks safely until the ears are dry enough to crib, even if this takes all winter; in fact, the ears will be safer in small well-made shocks than in the crib. If the corn is very immature there is danger of molding in large shocks, but if properly cured, such fodder has about the same feeding value as timothy hay.

CRIBBING

Except under very humid weather conditions, ears of corn, even if very high in moisture content, can be stored without molding by hanging them up in a shelter where they will be fully exposed to the wind. In a crib, however, air movement around the ears is greatly restricted, and for safe storage in ordinary cribs the moisture content of the kernels should be down to 20 percent when the corn is cribbed. In a large part of the Corn Belt, corn cribbed with 20 percent moisture usually does not dry below 15 to 17 percent moisture in winter, but further drying takes place after the weather warms up in spring. Under normal conditions it will be dried down by early summer to 13½ percent moisture, which is about the upper limit for safe storage as shelled corn in tight bins.

THE TRENCH SILO

Location.—A tight soil is desirable, though trench silos are being used in black loam soils, in soils containing lime and in sandy loam soils. They are not suited to sandy soils unless walled on the sides. Good drainage is essential. This applies to subsurface as well as to surface drainage. A south slope, free from seep water and from underlying rocks, is a favorable location for a trench silo. The silo site should be convenient to the barn or feed lots and to a good water supply for filling. It should be easily reached with a wagon at all times. It may not be possible to secure a site possessing all the desired qualifications, in which case good drainage and a firm soil are the essentials to be considered. Unless subsoil conditions are well known the use of a soil auger is recommended when locating the site for a trench silo.

Size of Trench.—A definite cross section area of trench suited to the feeding requirements should first be decided upon. A common failing has been to dig the trench too wide. Capacity is secured in length rather than with width. Multiplying the total depth by the width half way up the side walls gives the cross section area. Each foot of length gives the cross section value in cubic feet. Well packed trench silage will weigh 25 to 30 pounds per cubic foot. Knowing the number of head to be fed and the amount to be fed each animal daily, the required cross section area can be determined.

SIZE OF TRENCH SILO TO BUILD

On basis of corn silage, feeding 35 lb. of silage per animal per day for 180 days and with silage averaging 35 lb. per cu. ft.

Tons of silage needed	Depth in feet	Width in Feet		Length in feet at top
		Top	Bottom	
16	6	8	6	23
32	8	10	7	28
48	8	12	8	36
63	8	12	8	47
79	8	12	8	58
95	8	12	8	70
111	8	12	8	81
126	8	12	8	92
158	8	15	11	97
236	10	16	12	99
315	10	17	12	126

At least one foot of silage should be used each five days to prevent spoilage. A cross section drawing of a narrow finish trench silo is shown to make clear some of the details of construction. Note that the ground surface is left sloping away from the silo. A silo of the dimensions shown, depth (8) times midwidth (8), gives 64 square feet cross section area or 64 cubic feet per foot of length. Sixty-four times 25

Source: USDA Farmers Bulletin 1976
Missouri Circular 346 - 509

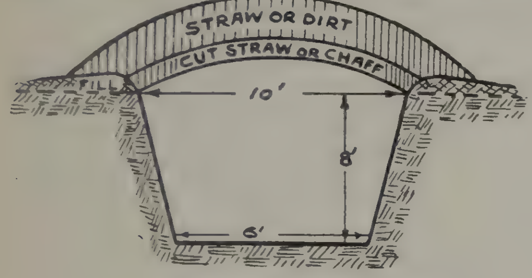
SOFT CORN – SILOS

(Continued)

(lbs. per cu. ft.) gives 1600 pounds per foot of length, sufficient to feed 10 head 30 pounds each day for five days. If the silo is used for summer feeding the amount fed would need to be doubled or the width and depth reduced to one-half.

Construction.—Trench silos with sloping walls are more successful than those with vertical walls. They are less subject to caving, easier to excavate, easier to pack, and the silage in settling makes closer contact with the walls and thus prevents air pockets. Smooth walls are also an essential in this connection. A sidewall slope of one foot in four feet of depth is suitable in most soils. Common cross section dimensions are top width 12 feet, bottom width 8 feet, depth 8 feet, which gives a cross section area of 80 square feet or about one ton of silage per foot of length.

When marking the silo site the bottom width dimension should be staked as well as the top width, then a strip is plowed the full length and width of the bottom dimension. The loose soil is removed with fresno or slip scrapers and piled on three sides of the plowed strip to keep surface water from entering the silo. Later plowings can be taken out at each end, driving back and forth through the silo and dumping at a distance on the sides. Some of this loose soil can be used for covering. It is not advisable to pile the loose dirt close to the silo to increase depth with less digging. The loose earth, being less compact, does not provide proper conditions for ensiling. Instances where logs were used to increase side wall height have shown damage by spoilage due to rats and mice working alongside and under the logs.



Cross section of Trench Silo

Keeping the trench covered with a roof, preventing runoff from entering, and fencing livestock out will greatly prolong the useful life of a trench silo.

Where rock is plentiful some owners who have had good success ensiling with this type structure are making them much more permanent in character by lining the trench with rock set in cement mortar. Where rock is not plentiful to keep costs low, a few are providing concrete side walls, using light weight, small mesh wire for reinforcing.

FENCE SILOS

Fence silos may be built with or without a lining. Snow fence, made of wire and slats, probably has been used most widely and has given the best results. The slats keep the fence from buckling as settling occurs and the upper and lower rings slide onto each other readily.

All kinds of building and roofing papers, with and without fibrous reinforcement may be used as lining. Reinforced papers give better results. Some papers are treated to resist acid and certain bacterial action.

The circumference of the silo is laid out on ground as nearly level as obtainable in a good location, as described under laying out foundations. The site should then be leveled. Set up the fencing in a true circle and securely fasten the ends together. Place the lining on the inside of the fence so the edge folds in along the bottom and clamp it temporarily to the top of the fencing strip with clothespins or other clamps. This section can now be filled within 6 inches of the top. The second section is then placed and held in position temporarily by binding the slats together about every 18 inches with twine. The bottom lining is placed inside the second course of fencing, and the lining for the second tier is placed so as to lap over the inside of the bottom strip. This prevents the fence from tearing the lining as the silage settles. The second section is filled to half its height. Then two No. 9 reinforcing wires are put around the first tier, pulled taut, and twisted together or fastened with small turnbuckles. Turnbuckles are inexpensive and make it easier to handle and salvage the wire. The twine used to hold the second tier of fencing in place may now be removed to allow it to settle freely inside the first tier. Other tiers are handled in the same manner till the silo reaches the desired height, usually not less than three nor more than six tiers.

Materials required for different sizes of lined fence silos

Size of silo		Capacity	Fencing [1]			Length of No. 9 wire [2]	Paper [3]
Diameter (Feet)	Height		Pieces	Length of each			
	Feet	*Tons*	*Number*	*Feet*	*Inches*	*Feet*	*Feet*
12	12	15 to 18	3	38	3	250	138
14	16	28 to 34	4	44	6	375	208
16	16	38 to 44	4	50	10	435	236
18	20	76 to 88	5	57	1	600	325
20	20	90 to 105	5	63	6	665	350

[1] If slat or snow fencing is used these lengths should be measured after the wire has been stretched.
[2] 2 hoops for each width of fencing.
[3] 4 feet wide.

Generally the height of an unsupported fence silo should not exceed its diameter. If it is built more than one tier higher than this, it should be surrounded by from 5 to 10 poles 6 to 8 inches in diameter firmly set in the ground. The poles are set against the silo walls and may be tied to each other above the silo with No. 9 wire and anchored for wind bracing, but in no case should the walls of the silo be fastened to them.

STACK SILOS

If roughage is plentiful, stack silos can be used in emergencies if the prospect of a high percentage of loss does not preclude their use. Either cut or uncut roughage can be stored in them. If not cut, the roughage is simply stacked in the most desirable form. Since losses occur principally around the outside of the stack, the larger the stack the smaller the percentage of loss. The stack should be packed as tight as possible to exclude air. It is best to feed out this type of silage by slicing layers off one end of the stack with a hay knife. When a cutter is available the cut material can be placed in a shell formed by bales of hay or straw, corn bundles, or loose weeds or grass. This method results in less spoilage and the silage is much easier to feed.

When bales of hay or straw are used for a silo they should be tied together with No. 9 wire as in the case of a fence silo. When a man knows before the material is baled that he is going to use the bales in building a bale silo, he can curve the bales by tying one of the baling wires shorter than the other. Tying one wire 6 or 7 inches shorter will give curves suitable for about a 16-foot silo.

Filling a corn-bundle silo with cut silage. Note the fence silos in the background.

Placing Wire Hoops on Baled Straw Silo. Hoop Tightening Tool Is Shown in Inset at Upper Left.

Source: USDA Farmers Bulletin 1820
Missouri Circular 346 - 509

SOFT CORN – CRIBS

To Reduce Damage to Corn in Crib Storage—

1. *Delay harvesting*—the corn will become drier late in the season, and the lower temperatures will retard or prevent winter growth of mold in the crib. Some farmers delayed harvesting the 1944 crop until the following spring with good results.

2. *Get the crib in order at once*—don't wait until the last minute.

3. *Stay out of the field* when husks and silk are wet from frost, snow, or rain.

4. *Divide the field* and harvest the high ground or the driest part of the crop first.

5. *Equip the picker with a fan* for blowing out loose husks and silk, if this equipment is available.

6. *Sort the corn*, taking out the green or soft ears for immediate feeding.

7. *Equip the elevator with an effective screen* for taking out shelled corn and dirt. If a screen is not furnished by the manufacturer, make a section of the spouting with rod bottom.

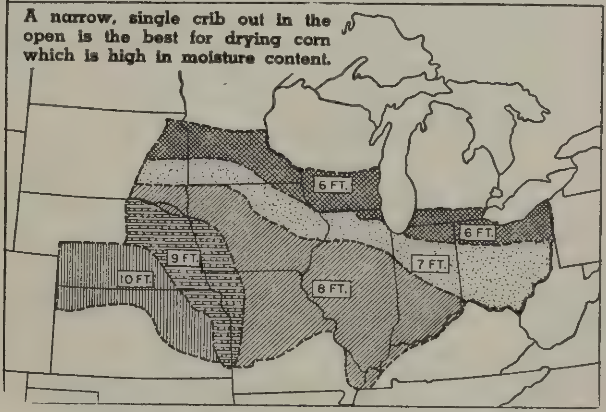
8. *Move the elevator spout frequently*, even if the corn seems to be clean. Elevator screens often take out only about half the shelled corn, and some shelling will occur as the corn drops into the crib.

9. *Provide ample ventilators* to give the wind access to the corn in the crib. Place orders early for lumber or ready-built ventilators.

10. *Pile the corn* only 2 to 3 feet deep in the cribs during the first part of the harvest season. This practice, however, is beneficial only in dry weather, for in driving rains, corn in the shallow layer will get wetter than that in a full crib. To dry before cribbing in the western part of the Corn Belt, high-moisture corn may sometimes be piled in long narrow ricks on dry sod.

NORMAL CRIB REQUIREMENTS

1. The crib should be no wider than the maximum that is recommended for the area where the corn is stored


A narrow, single crib out in the open is the best for drying corn which is high in moisture content.
6 FT.
6 FT.
7 FT.
8 FT.
9 FT.
10 FT.

Maximum crib widths recommended for the commercial corn area.

2. A floor and good drainage are necessary to protect the corn from ground moisture.
3. A tight roof is essential in humid areas and also in the western part of the Corn Belt, if the corn is to be stored through the summer.
4. The crib should not be sheltered from the wind by trees or by other buildings. It is wind pressure that causes air movement through the crib.

CRIBBING SOFT CORN

MOISTURE CONTENT OF 20 TO 25 PERCENT

Corn containing 20 to 25 percent moisture in the kernels may be severely damaged if harvested and cribbed without special precautions. Harvesting should be delayed until cool weather (the latter part of October or early November in the central part of the Corn Belt). Clean husking is important. Shelled corn should be screened out as the corn goes into the crib. Green or soft ears should be sorted out. Crib ventilators will be beneficial and their use is recommended, especially if the moisture content is near 25 percent or if the crib width exceeds the maximum recommended for the locality.

Source: Farmers' Bulletin 1976
Iowa State College

MOISTURE CONTENT OF 25 TO 30 PERCENT

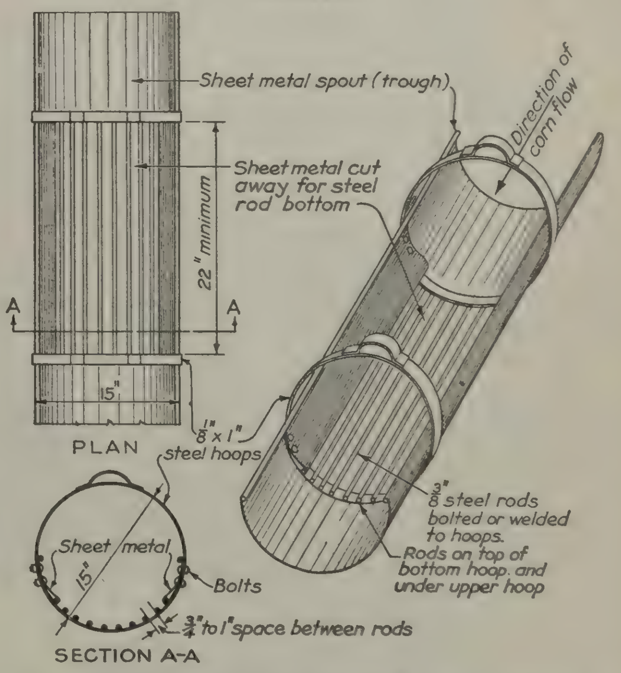
Corn containing 25 to 30 percent moisture in the kernels is very likely to spoil in cribs. It should be allowed to dry in the field as long as the weather is favorable and should not be harvested until the weather is cold. Then every precaution should be taken to remove husks, silk, and shelled corn, and the corn should be sorted to remove the softest ears. Crib ventilators should be used with spacing not more than half the width of the space between ventilators or between ventilator and crib wall. If these conditions are provided, with normal drying weather in spring the corn may dry out and store through the following summer without severe damage, but it should be watched closely for any signs of heat or mold damage as the weather warms up in spring. If heating or molding starts at this time, it may be best to feed the corn promptly, to ensile it, or to sell it if possible. If it is necessary to hold it in crib storage—

1. Move the corn as soon as possible. Loosening what has settled through the winter permits better air circulation in spring, when drying can occur.
2. As the corn is moved, sort out loose husks and silk, shelled corn, and chaff. Any debris that partially fills the spaces between the ears is detrimental to air movement. A good deal of the shelled corn and chaff can be sorted out by scooping with a cob scoop rather than with a grain scoop. Elevators can also be so made as to screen out some of these materials. If possible, an air blast should be used to blow out husks and silk.
3. Sort out any soft or moldy ears.
4. Then place the corn in a well-ventilated crib.

MOISTURE CONTENT ABOVE 30 PERCENT

Corn containing more than 30 percent moisture in the kernels is likely to spoil in the crib if held longer than through the cold winter months. If possible it would be better to handle it by methods other than cribbing. There may be heat and mold damage in the crib even in winter, unless good aeration is provided by the methods suggested for corn of lower moisture content. If corn of more than 30 percent moisture must be kept in storage after cold weather ends, the possibility of drying with heated air may be investigated. Forced ventilation is another possibility. Otherwise, a good deal of moving and spreading in thin layers may be necessary to prevent spoilage by heating and the growth of molds

CLEANING


Sheet metal spout (trough)
Direction of corn flow
Sheet metal cut away for steel rod bottom
22" minimum
A
A
15"
$\frac{1}{8}$" x 1" steel hoops
PLAN
$\frac{3}{8}$" steel rods bolted or welded to hoops.
Rods on top of bottom hoop and under upper hoop
Sheet metal
15"
Bolts
$\frac{3}{4}$" to 1" space between rods
SECTION A-A

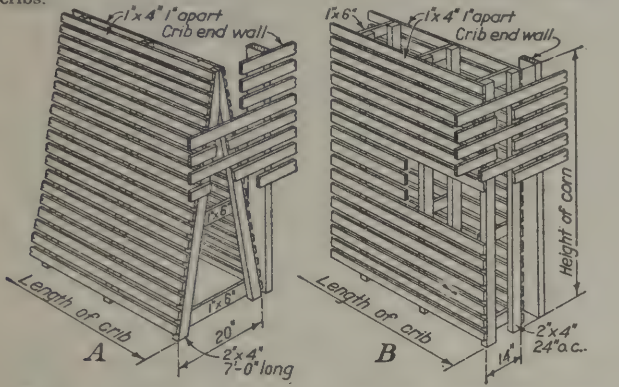
Section of spouting of grain chute equipped with rod-bottom separator, by use of which the ear corn passes into the crib and the shelled corn, chaff, and dirt is removed.

SOFT CORN – CRIBS

WIDTH AND EXPOSURE OF CRIBS

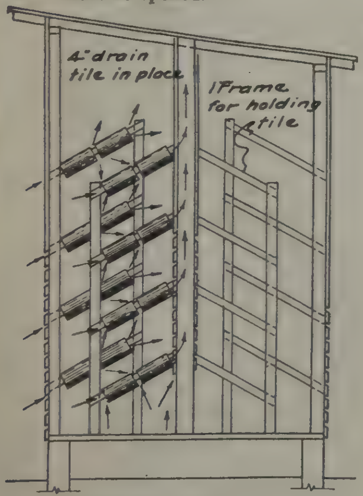
The width of the crib is the most important dimension affecting air circulation. A wide crib filled with corn offers more resistance to air movement than a narrow one. Tests show that in a 10-foot crib the air movement per bushel of corn is only about two-thirds that through an 8-foot crib. Filling the driveway of a double crib makes the building into a single crib the entire over-all width of the building. This should be done only when the corn contains less than 20 percent moisture and then only through the cold winter months, unless the moisture content is down to 12 or 14 percent.

In soft-corn-crop emergencies various types of removable ventilators have been used to increase the air movement through the corn in cribs.



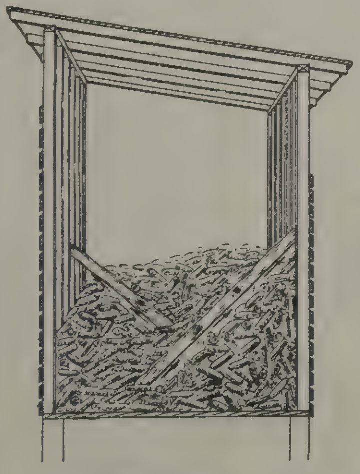
Ventilator *A*   the A-frame ventilator, should run through the center of the crib from end to end to allow the passage of wind. It may be best to block the ventilator midway in its length, but these ventilators have proved successful both with and without blocking. Filling above the top of the ventilator should be delayed until the latter part of the harvest season, when the corn will be drier and the temperatures lower. This ventilator sets below and clear of the cross ties in the crib and can be built in sections that are short and not difficult to handle. It causes some inconvenience in emptying the crib.

Ventilator *B*   with vertical sides, runs from end to end of the crib, full height of the corn, so that wind can blow through the center. It is the most effective, but the objections are that (1) considerable lumber is required to build it; (2) the cross ties interfere with installation; (3) if built in sections between the cross ties the sections are heavy and awkward to handle; and (4) in emptying the crib a central shelling trench cannot be used—both sides of the crib must be opened.



Drain-Tile Ducts for Ventilating Cribbed Corn

These ducts can be arranged not only to carry the moist air out of the crib but also to bring in drier air from the outside.



A Simple Scheme for Aerating Corn

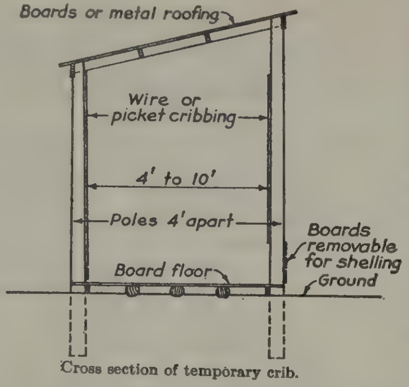
As the corn settles under these rails, an air passage is formed and the air discharges from the center of the crib, carrying with it the heat and moisture given off by the corn.

When cribbing soft corn, delay harvesting until cold weather, husk clean, and *provide plenty of crib ventilation.*

Source: Farmers' Bulletin 1976
Univ. of I[illegible]l. Circ. 293

TEMPORARY CRIBS

When permanent cribs do not have sufficient capacity for the entire crop, temporary cribs should be built for the rest of it. The most common type is that made with woven or welded wire cribbing or with picket cribbing (snow fencing) set in a circle, but in an emergency woven fence wire can be used. The usual diameter of a circular crib is about 16 feet; it is most frequently made with a 50-foot length of fencing. If the corn has a high moisture content the crib diameter should be reduced to 12 feet or even less, especially in the more humid parts of the Corn Belt. A circular crib is not the best type for moist corn, because the diameter is usually greater than the recommended width of a rectangular crib and, when it is filled by elevator, the debris of shelled corn, husks, and silk accumulates in the center, which is the worst possible position for it.



Cross section of temporary crib.

A better type of temporary crib for soft corn is made in rectangular shape by using poles set about 4 feet apart to support wire or picket cribbing for the walls, which are 4 to 10 feet apart,

The corn will be better aerated than in a circular crib of ordinary diameter, and the roof is more easily built.

Usually the most practical floor for a temporary crib is made of boards laid on timbers or split logs that will support them about 6 inches above the ground. A shelling trench through the center of a circular crib will save labor when the corn is shelled out; it also provides some of the ventilation needed for moist corn.

If corn is piled on the ground when harvested and is not fed during the winter, it should be moved into cribs before spring. It is hazardous to crib corn when it is mixed with snow and ice or when it is wet from rain. It had better stay in the pile until the corn on the surface is dry.

FORCED VENTILATION WITH UNHEATED AIR

The principal difficulty in forced ventilation of corn in a crib, aside from the expense involved, is getting equal air movement through the different parts. If air is driven by a power blower into a ventilator in the center of the crib, the ventilator and its location should be such that the escaping air must pass through as nearly as possible the same thickness of corn in all directions. Any husks or shelled corn mixed with the mass should be uniformly distributed, as air escaping from the ventilator will bypass any spot having excess debris.

To dry corn successfully in a crib by forced ventilation with unheated air, it is necessary to operate the blower frequently enough to prevent heat and mold damage until the weather is cold and thereafter for a long period in spring when the weather is warming up. Uniformly clean corn and proper design and location of the ventilator are necessary for uniform distribution of air flow. Unless these requirements can be met, forced ventilation with unheated air cannot be generally recommended.

DRYING WITH HEATED AIR

If a seed-corn drier is available within trucking distance, artificial drying of soft corn before cribbing may be practical. This process involves extra handling of the corn (into and out of the drier) and the operating expense for fuel and power, but the cost of providing ventilators in the crib is eliminated. At the present stage of development of artificial drying plants the first cost is an obstacle to construction for drying corn for feed or market under Corn Belt conditions.

If the dried corn is to be sold for any use except livestock feed, care should be taken not to overheat it. Air temperatures higher than about 110° F. apparently cause undesirable changes.

In some cases soft corn has been dried successfully by blowing heated air into a ventilator in the center of the crib. If a furnace is available for temporary use and an ensilage cutter or a threshing-machine wind stacker for blowing the air, the equipment can be set up without a great deal of expense. It is necessary to provide the same conditions to get uniform distribution of air flow as explained for forced ventilation with unheated air.   The path of the air between the points of entering and leaving the corn should be as short as possible, preferably not more than 4 feet, for if the path is too long, water evaporated by warm air near the inlet may be redeposited in another part. Under good conditions, drying a crib of corn may be accomplished in less than a week of operation.

SALTING SOFT CORN . Salting is not a substitute for other measures. Good aeration to dry the corn is still necessary.

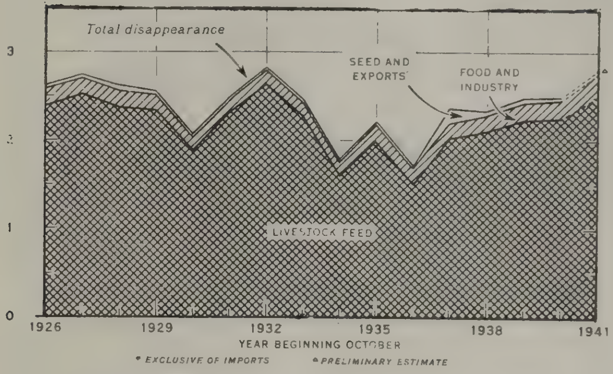
CORN FACTS

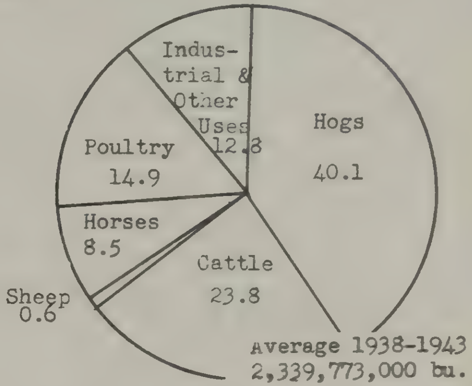
Corn is the most important crop of the United States whether judged by acreage, production, or value. The acreage harvested averages nearly one-fourth of all crop land harvested—the 1931-42 average of 94,511,000 acres equals 31% of the area occupied by the 52 major crops harvested.

The annual production from 1931 to 1942 averaged 2,349,267,000 bushels but in 1942 and 1943 production exceeded 3,000,000,000 bushels.

	1926-30 Average Percent	1931-35 Average Percent	1936-40 Average Percent
Livestock Feed	91.35	91.83	88.97
Seed	.72	.79	.71
Exports	.69	.15	2.03
Food and Industry	7.24	7.23	8.29
Dry Process Products	2.08	1.77	1.75
Alcoholic Beverage	.30	.89	1.32
Wet Process Products	3.22	2.87	3.48
Breakfast Foods	.40	.28	.33
Farm Household Use	1.24	1.42	1.41

USES OF CORN



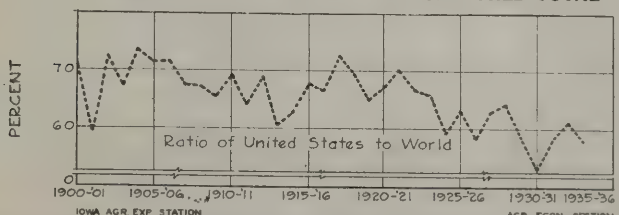


The record crop was produced in 1942 and was estimated at 3,131,518,000 bushels. The smallest crop was in the drouth year of 1934—only 1,461,100,000 bushels. The crop now in prospect, June 1944 is estimated at 3,000,000,000 bushels and if harvested will be the third successive crop to exceed three billion bushel.

The value of the corn crop at the price received by farmers varied from $824,685,000 in 1931 to over $3,100,000,000 in 1943.

The United States formerly produced nearly 70% of the total world corn supply, but in recent years this has declined to slightly more than 50%. The change is due primarily to increasing acreage outside of the United States particularly in Argentina, Brazil, and the Danube Basin.

U. S. CORN PRODUCTION AS PER CENT OF WORLD TOTAL



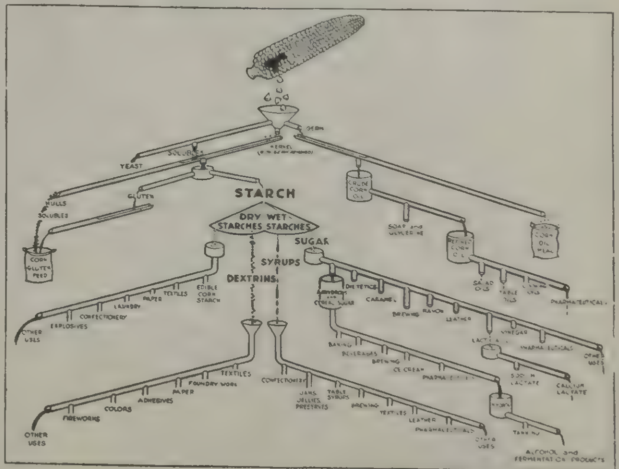
IOWA AGR. EXP. STATION AGR. ECON. SECTION

The net movement of corn from farms is only about 10%. Nearly 20% is sold but 10% is bought back as commercial feeds, leaving only about 250,000,000 to 300,000,000 bushels for industry, exports and other uses off the farm. The disposal of the crop has been about as follows:

Although corn production is widely distributed, sales even to near-by farms are restricted to two comparatively small areas centering in eastern Illinois and western Iowa.

Corn prices are particularly dependent upon the amount of livestock held in feed lots at the beginning of any harvest season because nearly seven-eighths of the entire crop produced is fed to cattle and hogs. Livestock numbers, on the other hand, are largely a reflection of consumer demand (over the prior months). When any class of livestock is produced at a loss, farmers tend to reduce production until conditions are more favorable.

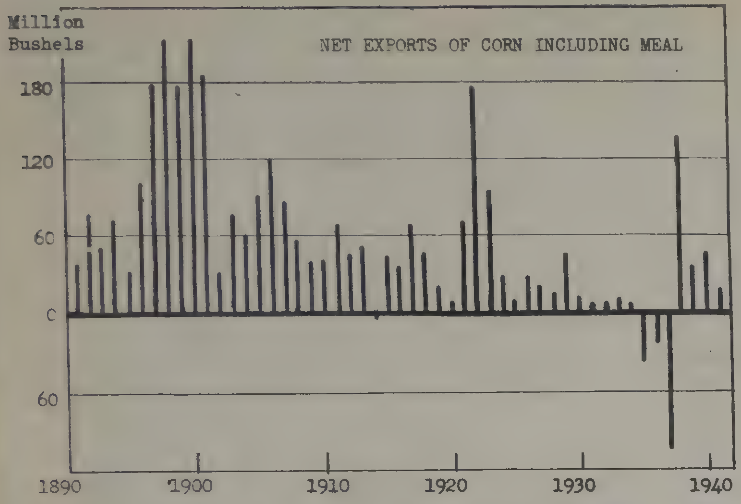
PRODUCTS MADE FROM CORN



Based on Data of U.S.D.A.&
Uni. of Iowa

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

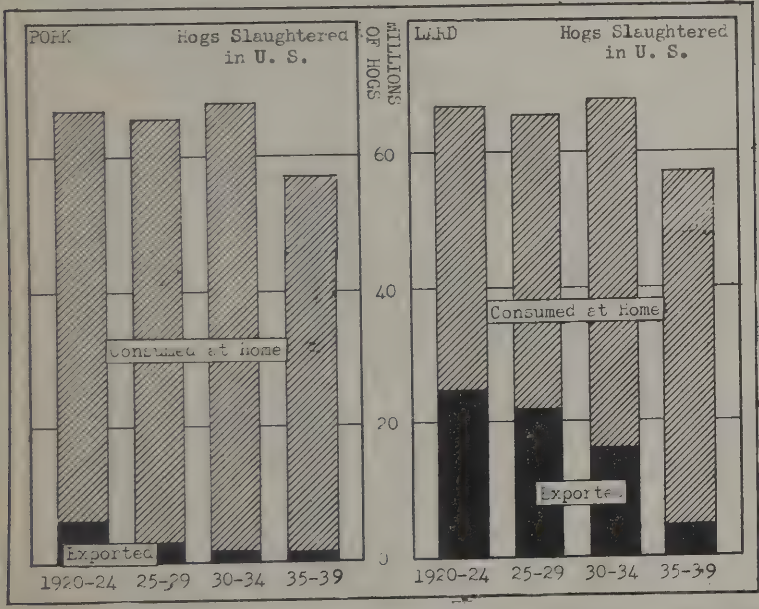
CORN FACTS



The United States normally has a net export of corn. In only four years out of the last 74 have there been net imports. Three of these four were the drought years of 1934-1936 inclusive.

The accompanying graph shows how the corn exports of the United States have dwindled to nothing. Even a more important factor is the declining exports of pork and lard, as it is in this concentrated form that corn reaches foreign markets.

Until the war broke out hog exports were made up chiefly of lard, which is produced in the animal body from carbohydrate feeds, most important of which is corn. For the period 1935-1939, about 91 per cent was consumed at home, leaving a lard surplus of 9 per cent. The present situation is complicated by the war effort. Many of the adjustments facing the hog industry in this country have been postponed until after the war. Vegetable oils, which were appearing in domestic markets before the war, will become more common. Soybean and peanut acreage have been more than doubled since the war began. Oil and lard inventories are building up in such exporting countries as Argentina, which cannot now reach the market because of the shipping situation. United States farmers will likely be forced to produce leaner hogs soon after the war unless lard exports can be kept at high levels. This will mean a material reduction in the amount of corn required because approximately three times as much corn is required to produce a pound of lard as a pound of meat.



Each hog killed yields about 125 pounds of pork and 34 pounds of lard. During 1925 to 1929 the per-capita consumption of pork was 68.2 pounds but was only 12.8 pounds of lard. Thus when the average American eats U.S. corn-fed hogs he leaves about a one-third surplus of lard.

The extent to which other countries were expanding their exports and capturing the world market is indicated by a gain in exports of 302 per cent for Argentina, 160 per cent for New Zealand, and 145 per cent for Poland. From 1925 to 1929 about five million acres were required to produce U.S. pork exports, but at the outbreak of the present war only about one-fifth of this acreage was required.

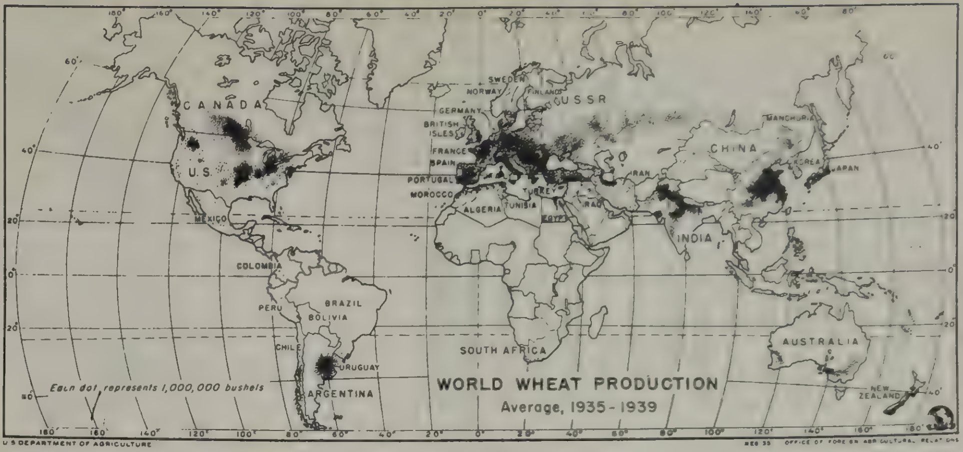
Before the introduction and general use of hybrid seed, corn production in the United States was on the decline. It remains to be seen whether this improvement in cultural practices can long hold up production against such powerful factors as depleted soil fertility, erosion, and pests. The severe drouth years of 1934 and 1936 cut production far below normal, but the very high yields of the last five years would not have been possible without highly favorable weather conditions. When another cycle of drouth years strikes, yeilds will again drop very low. The European Corn borer, after being held fairly stationary for several years, has expanded the area of infestation by leaps and bounds in the last few years. All of Illinois is infested and the pest has spread half way across Iowa and Missouri. It will be only a matter of a few more years until the entire corn belt will be infested. Another pest of similar nature is the Southwestern Corn Borer now entering the corn belt from the Southwest.

Corn and livestock are closely linked together, and the market for corn is primarily dependent upon the volume of livestock feeding. The amount of livestock on feed is regulated by the demand for meat and meat products and the scarcity of feed, chiefly corn.

Most corn exports are in the concentrated form of lard, of which the U.S. regularly has a surplus because of the disproportionate consumption of pork and lard. The drastic declines in corn, pork, and lard exports were a factor in lower corn prices prior to the war.

Based on Data of U.S.D.A.

WHEAT FACTS

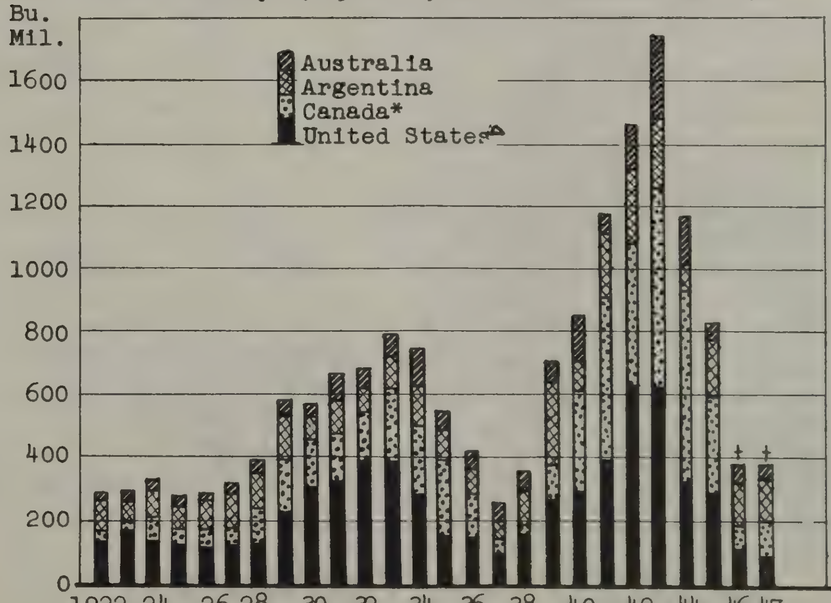


Wheat is the most widely grown of all food grains. Harvest occurs somewhere in the world every month of the year.

The United States is the world's largest producer today but before the war Russia was in first position, with China second and the United States third. Normally Russia uses almost all of her wheat domestically and has little left over for export. China is a net importer.

The four principal exporting nations are Canada, Argentina, the United States and Australia. The United Kingdom is the world's largest importer and normally takes about 1/3 of all wheat entering into world trade.

Estimated Wheat Stocks in Four Major Exporting Countries- As of July 1, 1922-46, and Indication for 1947



* Includes Canadian Wheat in United States
△ Includes United States Wheat in Canada
† Preliminary

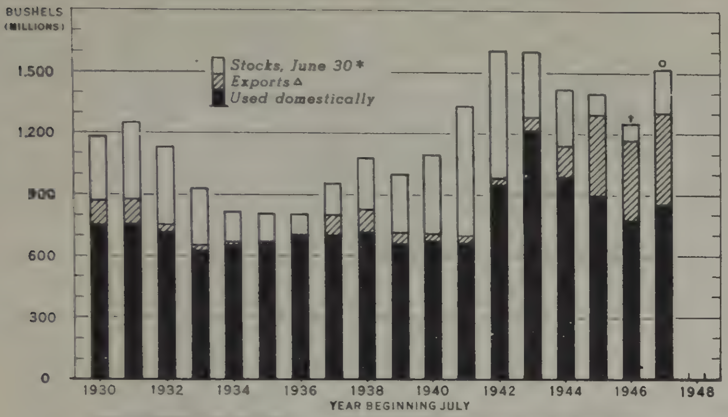
World exports of wheat in 1946-47 totaled about 750 million bushels. Of this total the United States supplied 397 million bushels, Canada 230 million, Argentina 60 million, and Australia, 49 million. These wheat exports made up more than half of the total tonnage of all foods entering export channels during the year. This was far short of the amount asked for by importing nations but much above the pre-war average of 560 million bushels. This strong export demand has been of primary importance in supporting domestic wheat prices during and since the war. Exports of wheat from the United States began to increase rapidly in 1944. During the three years ending June 30, 1947 an average of 313 million bushels was exported. The goal for 1947-48 is set at 500 million bushels. Export of such a large amount of our production has been possible only because of record breaking production. From 1932-41, the supply of wheat in the Continental United States averaged only 982 bushels. During this period exports averaged but 43 million bushels and imports for domestic use averaged 9 million bushels.

The Wheat carryover in the United States on June 30, 1947 was 83 million bushels. This was about the same as in June 1937 when stocks, because of drouths, were reduced to the lowest level since

(continued on back)

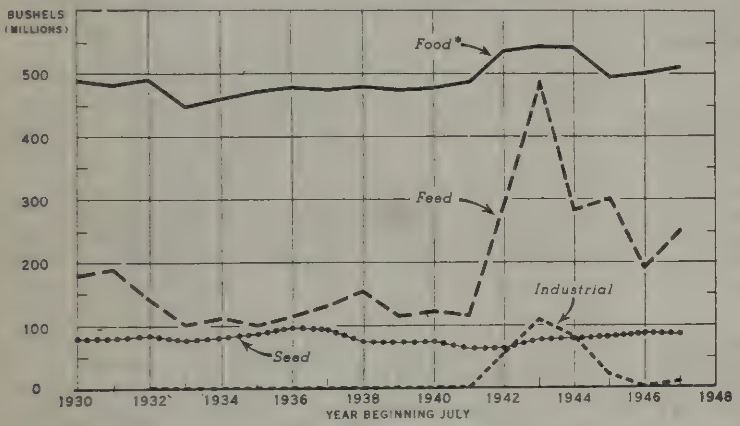
WHEAT FACTS

DISTRIBUTION OF U. S. WHEAT SUPPLY, 1930-47



*1930-36 INCLUDES SOME NEW WHEAT △ INCLUDES FLOUR MILLED FROM DOMESTIC WHEAT ONLY
†PRELIMINARY ○ TENTATIVE
U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

DISTRIBUTION OF WHEAT USED DOMESTICALLY, 1930-47



*INCLUDES USE BY MILITARY SERVICES 1946 PRELIMINARY 1947 TENTATIVE

U. S DEPARTMENT OF AGRICULTURE NEG 46050 BUREAU OF AGRICULTURAL ECONOMICS

(Continued from front)

1918. Small carryover stocks are always a bullish factor in the price of wheat and the continuing heavy export demand will prevent any major accumulation of stocks out of this years record crop.

The European wheat crop was cut short by winter killing and summer drouth in 1947. However, production is on the increase in some parts of Europe and import needs will begin to decline by the middle of 1948 or 1949. This will permit the United States and other exporting nations to again build up their reserves (or carryover) if production stays high. As these build up lower world prices can be expected. With very few exceptions wheat prices fall when the carryover is large and rise when the carryover is small.

Record production in the United States has been possible only at the expense of our natural resources. It is estimated that 2 million acres or more of western grasslands have been plowed and sown to wheat in the last three years, 85% may be abandoned later. In addition, moisture reserves have been depleted over broad sections in the dry farming areas. Summer fallowing and conservative practices have been neglected or given up entirely in an effort to produce more wheat for export and to cash in on current high prices. Drouth conditions have returned to the western part of the winter wheat belt this fall and unless winter precipitation is considerably above average the 1948 wheat crop will be far below the record 1947 crop.

Wheat Production in Specified Countries, Average 1935-39 and 1946

Country	1935-39	1946
United States	759	1,156
Canada	312	421
Mexico	14	14
Continental Europe	1,556	1,273
U. K. and Eire	70	88
North Africa (4)	119	105
Asia	529	545
Argentina	222	221
Australia	170	115
Union of South Africa	16	18
Estimated world total, Millions of bu. excl. U.S.S.R. & China	4,040	4,150

Data are, in many instances, unofficial forecasts and should be interpreted as indications only.

Wheat Harvest Time Around The World

Producing Area	Harvest Period
New Zealand and Chili	January
East India, Upper Egypt	Feb.-Mar.
Lower Egypt, Syria, Cyprus Persia, Asia Minor, India, and Mexico.	April
Algeria, Central Asia, China, Japan, Morocco and Texas.	May
Turkey, Greece, Italy, Spain, Portugal, South of France, Southern U. S. A.	June
Roumania, Bulgaria, Austria, Hungary, Czechoslovakia, South of Russia, Germany, Switzerland, France, South of England, Northern U. S. A.	July
Belgium, Holland, Great Britain, Denmark, Poland, Quebec, Western Canada, Columbia, North and South Dakota.	August
Scotland, Sweden, Norway and North of Russia.	Sept.-Oct.
Peru, South Africa and Australia.	November
Burma and Argentina	December

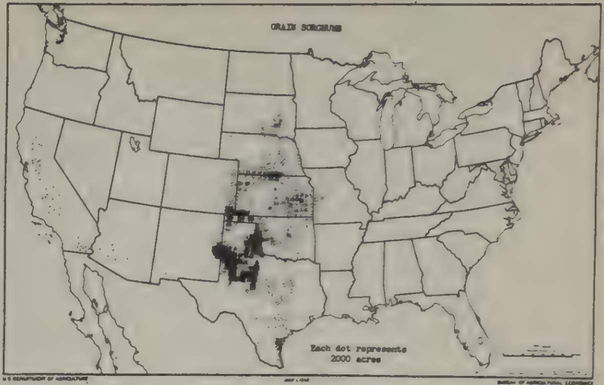
GRAIN SORGHUMS – ANOTHER MIRACLE?

The sorghum family has supplied grain, forage, silage, syrup and human food for at least 4000 years. Yet, until quite recently in this country, it sat quietly among our minor grain crops watching hybrid corn revitalize the corn belt, and the upstart soybean make itself at home in this country, both within two short decades.

During the war years, grain sorghum suddenly staged a spectacular upsurge of its own, which promises to alter the economy of the "sorghum belt" as drastically as soybeans and hybrid corn changed that of the corn belt. Average production in bushels was 86,543,000 from 1935 through 1944, and rose to a high of 181,756,000 bushels in 1944. After a drop to 97 million in 1945, it rose again to 106,737,000 bushels in 1946.

DISTRIBUTION, VARIETIES AND CHARACTERISTICS

The Grain Sorghums Belt is located in the Great Plains Area, with the eastern boundary states leading in production. Texas produces about 60% of the total amount of grain sorghum, with Oklahoma, Kansas, Nebraska, and South Dakota following in that order. Colorado, New Mexico, California and Arizona are next in importance. The last few years have witnessed the crop moving into Ohio, Indiana, Missouri, southern Michigan, Maryland, Delaware, Virginia, Georgia, Alabama, South Carolina and Florida.



The three major grain sorghum groups are the milos, the kaffirs, and the hegaries. Each group has gained wide acceptance in various regions. However, there have been so many crosses within and between groups in recent years, that variety acceptance is in a state of flux all over the sorghum belt. The following table must be considered as reflecting a very general situation, with the position of each variety listed being not at all secure in its role of local favorite. The grower should keep constantly in touch with his county agent for the latest and best adapted varieties for his area.

	VARIETY	MAJOR GROWING REGIONS	CHARACTERISTICS
MILO GROUP	Martin's dwarf combine milo.	Texas mainly. Grown widely throughout belt.	Slender, leafy stalk with 11 or 12 leaves. Does not tiller*or side branch. (Should be planted thickly.)
	Plainsman	Texas, Kansas, New Mexico	Dwarf - Tillers slightly. Stands long after maturity.
	Caprock	Texas, Kansas, New Mexico	Dwarf - slightly later maturing than Plainsman, and with longer seed branches, larger, less compact head. Produces more grain under favorable conditions
	Double dwarf-- white milo yellow	Planted widely throughout belt. California	Best variety for late planting - late June to early July. Blooms in 2 months, matures in 3. Good starch producer. Close spacing gives best results.
	Midland	Northern part of belt. Kansas, Nebraska, higher altitudes of New Mexico.	Stiff slender stalks. 11 or 12 leaves, tillers slightly. Constituted ½ the 1946 crop in Kansas and Nebraska.
	Westland	Same as Midland but giving ground to latter.	Similar in performance to Martin and Midland. 12 to 14 leaves. Tillers slightly.
	Wheatland	Regions which allow late maturing.	Dwarf; tillers heavily; mid-leafy; semi-compact head.
	Dalhart Wheatland.	Texas Panhandle.	Matures between Martin and Plainsman. Pythium root rot resistant strain out of Wheatland.
HEGARI GROUP	Standard Hegari	Regions of low average rainfall and higher altitudes with short growing seasons.	Heavy grain producer. Excellent for silage bundle feed and pasture. Superior to other sorghums in feeding tests.
	Early Hegari	Texas, Arizona, Alabama and upper panhandle. Heavy clay soils of lower plains region. Other southern states.	2 weeks earlier than Standard. Better adapted for combining. Sure producer.
	Bonita Hegari	Same as Early with emphasis on the rolling plains of Texas.	Tillers freely. Lacks uniformity. A high yielder nevertheless. Grows at higher altitudes, lower rainfall than Standard.
KAFFIR GROUP	White Kaffirs: Standard Dwarf Reeds Blackhull White Imperial, etc.	Kansas, Texas, Oklahoma, mainly.	Tillers little, medium height, stalks medium, grain head semi-compact.
	Red Pink Kaffirs	Kansas, Texas, Oklahoma, mainly.	Almost outmoded. Late maturity, with other characteristics similar to Blackhull.
WAXY GROUP	Leoti McLean Sorgos	Widely throughout belt.	Grown mostly for forage.
	Certain Gooseneck Strains	Throughout South.	Grown for syrup.
	Schrock Sagrain	Texas, Oklahoma, Mississippi, Arkansas and Kansas.	Used for grain or forage.
DUAL	Atlas	Kansas, Iowa, Oklahoma, Nebraska and Missouri.	Grown for grain and forage. Best dual purpose variety.

*Tiller - New shoots from roots of main stalk.

(Printed in U.S.A.)
DOANE AGRICULTURAL SERVICE, Inc., St. Louis 12, Mo.

GRAIN SORGHUMS -- ANOTHER MIRACLE?

(Continued from front)

WHY SORGHUMS?

Drouth during the middle 1930's gave sorghums their first shot in the arm. Several characteristics of sorghums make them able to withstand severe conditions:

1. They have a mass of fine roots which draw more of the available moisture from the soil.
2. Their comparatively small leaf area reduces the loss of moisture.
3. They have an evaporation-resistant waxy coating on leaves and sheaths.
4. Their leaves roll up when drouth conditions prevail.
5. They have the ability to suspend growth during periods of severe drouth and then resume growth when conditions improve.
6. Finally, the grain is even less susceptible than corn to hot weather damage after its formation on the plant.

A second boost was given grain sorghums by the favorable markets opened up by the war. Much research went into determining the various uses to which the grain could be put. As a result it became increasingly important in livestock feeding and as human food. It also moved into such new fields as malting, distilling, and starch manufacturing.

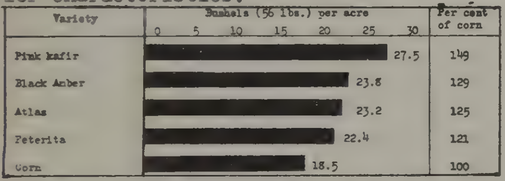
As readily as any other crop grain sorghum can be adapted to mechanical handling. It is now possible for one man to completely handle 160 acres of the crop. This was very important during the war, and all signs point to its continuing importance.

A third stimulus is indicated for the near future, as reports of hybrid growing trials give production figures as high as 130 bushels per acre.

CULTURAL PRACTICES

The growing of grain sorghums in regions showing wide differences in climate and soils, makes it impossible to list or discuss the many details of local cultivation. There are practices, however, common to all regions.

1. Choose best adapted variety. New varieties will be introduced from time to time which will have superior characteristics.



Comparative grain yields of four sorghum varieties and corn at the Agricultural Experiment Station, Lincoln. Averages for 13 years, 1925-39, with no tests in 1926 and 1933.

2. Seed selection. Crosses of different varieties of sorghums take place with such ease that there is always danger of impure or mixed variety seed. Examine carefully for impure seed before buying or planting.

3. Seedbed preparation. The three most important factors are; conserving moisture (especially in main sorghum belt), killing weeds, pulverizing and warming the soil. Sorghums need warm soil for good germination. Since they grow slowly at first, weeds must be killed before planting.

The method of seedbed preparation which has produced the largest yields is: blank listing in the fall, with ridges thrown in in the spring and re-opened at planting time.

Planting date. Like every other crop, the time needed to mature a given variety of grain sorghums must fit into the length of the growing season. Picking the adapted variety will solve this problem if you make certain the soil is warm and there is no danger of frost. Certain varieties must even wait for hot weather.

Row and Seed spacing. 40 to 42 inch rows are considered good row spacing. The seed spacing, however, varies with varieties and soils. Consult your County Agent as to proper seed spacing of the adapted variety.

Planting depth is 1 to 1½ inches. The soil should be firmly packed to retard soil drying immediately around the seed.

Cultivation is the same as for corn, with the growth of weeds determining the number of cultivations. Shallow cultivation gives best results.

Harvesting with the combine is increasing rapidly, which is the main reason for the great demand for dwarf varieties. Be sure grain is dry (less than 14% moisture) before combining. Remove all but 2 rows of concave teeth, and lower the concave bars on machines using rasp cylinder and concaves. Reduce cylinder speed from 1/2 to 2/3 the normal speed used for small grain. This will avoid cracking of grain.

Storing difficulties are especially great for this crop. Most are due to too high moisture at combining or threshing time. These steps will overcome storage troubles:

(1) Grow short-season varieties; (2) avoid cracking grain; (3) avoid getting stalk material into grain; (4) examine grain periodically during storage, and move if necessary; (5) bin drying with special drying equipment may be necessary in humid regions.

ROTATIONS

Sorghums are among the heaviest users of soil nutrients of all our crops. It is absolutely necessary to follow a rotation which takes into account the following sorghum characteristics: (1) It heavily depletes soil moisture, (2) it leaves the soil hard and lumpy and difficult to work, (3) it temporarily ties up available nitrates. The first can be overcome by fallowing. The second calls for fall plowing and listing so that winter freezes and thaws can break up the coagulated soil particles. The last must be remedied with manure and fertilizers.

A good three year rotation in the plains region is summer-fallow, wheat, grain sorghum and back to summer fallow.

In regions where fallowing is not ordinarily necessary, it may still be advisable to wait until spring to plant a small grain so that soil moisture and available nitrogen may be replenished.

DISEASES AND THEIR CONTROL

Seed and seedling rot. This disease is caused by fungi which destroy the power of the seed to germinate. Cool moist soil conditions are most favorable for their development. They also often attack the primary roots of young seedlings as they emerge from the seed.

Control may be accomplished by (1) planting well-matured, unbroken or unnicked seed, (2) treating with a good dust disinfectant (New Improved Ceresan, for example) and (3) waiting until soil is warm enough for prompt germination.

Head Smuts. There are several smuts which attack the grain heads, and they are controlled in much the same manner. The steps are, (1) planting smut free seed, (2) treating seed with a good disinfectant, and (3) using smut resistant varieties.

Root and Stalk diseases. Pythium root rot, weak neck, charcoal rot and the various stalk rots, attack sorghums when well along in maturity.

Direct control measures have not yet been worked out, so the grower must depend mainly upon choosing resistant varieties, using rotations, and controlling the insects which attack the sorghum stalks and make openings by which stalk rot fungi gain entrance.

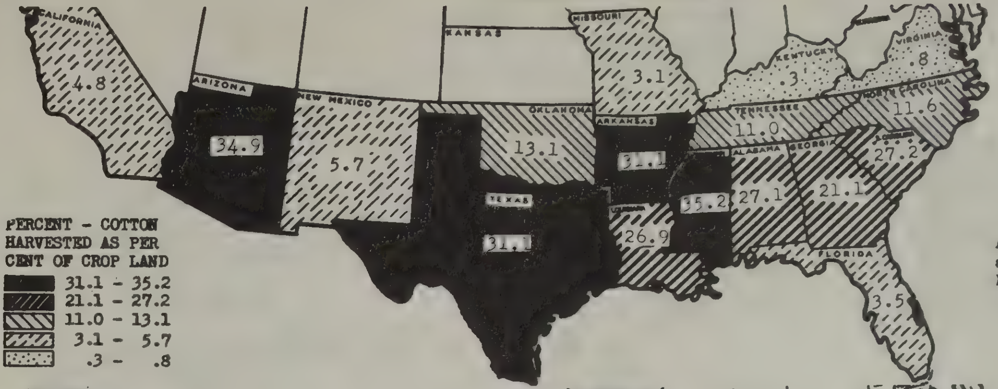
AS LIVESTOCK FEED

Grain sorghum has 90 to 95% of the feeding value of corn. For dairy cows and sheep it is practically the same, pound for pound. It is not as efficient, however, in fattening hogs or cattle.

Best results are obtained when the grain is ground, except for poultry and sheep. Also when feeding calves for market, it is best to confine ground grain feeding to the first half of the feeding period, and follow with cracked grain for the second half. This will produce calves with a better market finish, according to Nebraska University experiments.

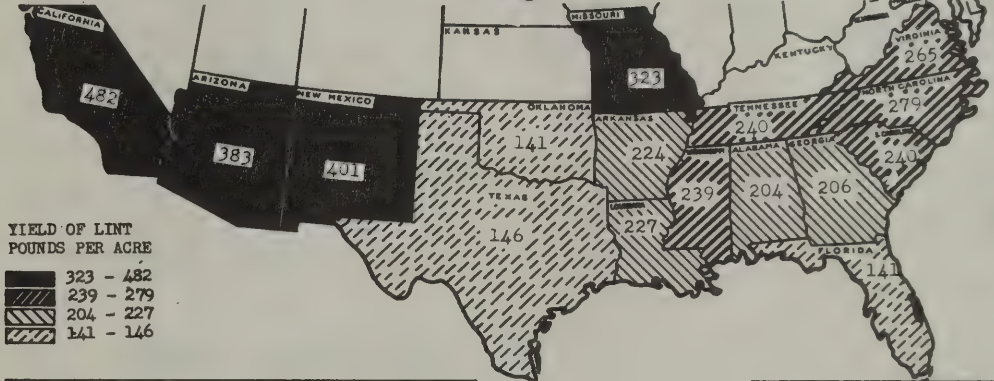
All the grain sorghums are highly palatable to livestock except for the brown-seeded varieties which contain the bitter tannin.

COTTON



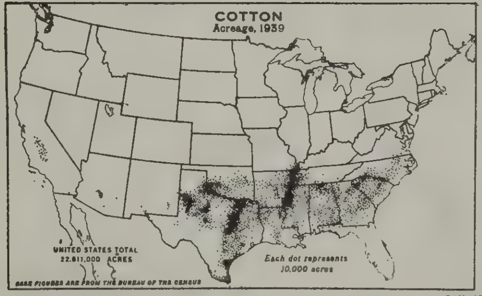
ACREAGE

Acres of Cotton Harvested as percent of crop land harvested 1939



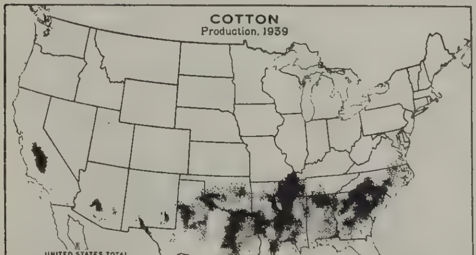
YIELDS

15 year average 1925 to 1939


COTTON
Acreage, 1939
UNITED STATES TOTAL 22,811,000 ACRES
Each dot represents 10,000 acres
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

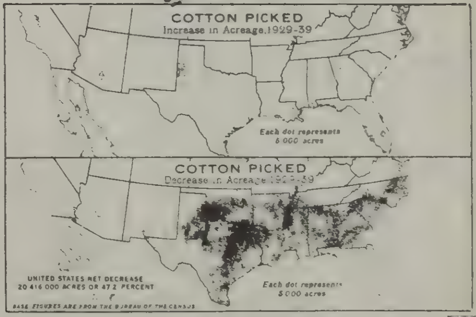
BAE 39855

Acreage of cotton in 1939 was the lowest since 1895. Heavy cuts in acreage under the Agricultural Adjustment Program, year after year, has brought down the acreage to the present low level. An increase in acreage of cotton in various other countries tended toward a decreased demand for American cotton. Planting of cotton begins in February in the southernmost part of the Cotton Belt and moves northward. Along the northern edge of the belt and in the higher altitudes, planting is usually completed in May.

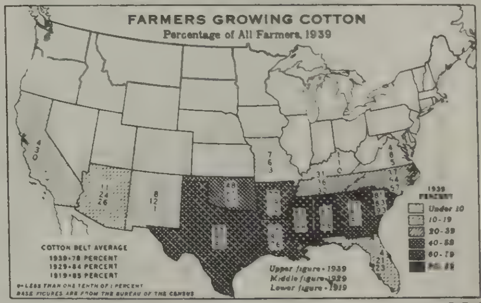

COTTON
Production, 1939
UNITED STATES TOTAL 11,481,000 BALES
Each dot represents 2,000 bales
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 39471

The production of cotton in 1939 was harvested from the smallest acreage since 1896 and was the smallest crop since 1923, except for 1934, a year of heavy drought, when the production was only 9,472,000 bales. Texas leads in the production of cotton, with 2,724,000 bales; Mississippi is second, 1,583,000 bales; and Arkansas third, 1,351,000 bales. Cotton is grown in the warm, humid States, with the exception of California, Arizona, and New Mexico, where it is irrigated.


COTTON PICKED
Increase in Acreage, 1929-39
Each dot represents 5,000 acres
COTTON PICKED
Decrease in Acreage, 1929-39
UNITED STATES NET DECREASE 20,416,000 ACRES OR 47.2 PERCENT
Each dot represents 5,000 acres
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

The heavy decrease of 47 percent in the acreage of cotton picked in 1939 as compared with that picked in 1929 is chiefly the result of acreage reduction under the program of the Agricultural Adjustment Administration. Increases in the acreage of cotton occurred in widely separated areas and in only a few counties. In some of these a variety of cotton was grown in which the acreage was not controlled by the acreage-allotment program.

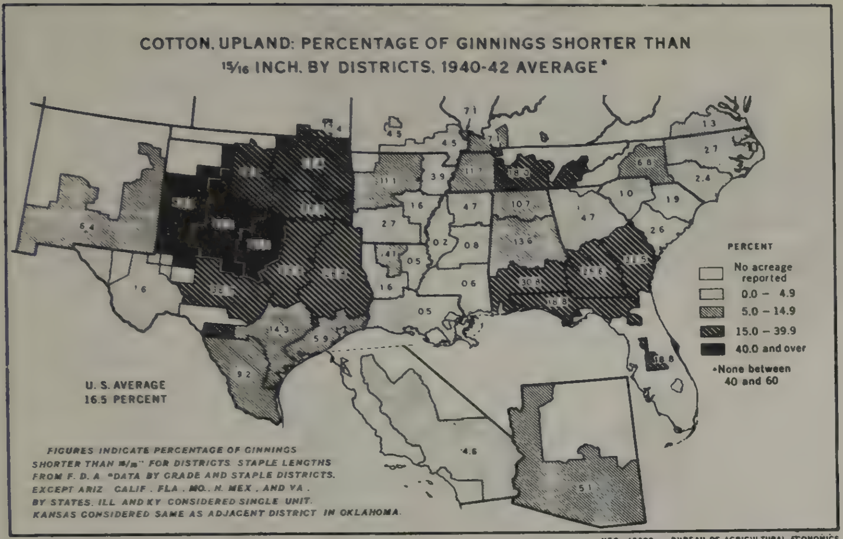


BAE 42140

In 1939 an average of 78 percent of all farmers in the Cotton Belt grew some cotton. From 1929 to 1939 a decrease of about 6 percent occurred. California and Missouri are the only States in which even a small percentage increase in number of farmers growing cotton occurred during that decade, whereas heavy percentage decreases occurred in Texas, Oklahoma, North Carolina, New Mexico, and Florida. Alabama, Mississippi, and South Carolina had the highest percentage of farmers growing cotton in 1939.

The boundaries of the Cotton Belt correspond closely on the north with the lines of 200 days of frost-free season and 77° F. summer temperature; on the south with that of 11 inches of autumnal rainfall, because wet weather interferes with picking and damages the lint, also increases boll weevil injury. On the west the boundary is approximately 20 inches of average annual rainfall. Further west, in southern New Mexico, Arizona, and California irrigation is necessary. The densest acreages are on the rich soils of the Yazoo delta and the prairies of Texas and Okl

COTTON



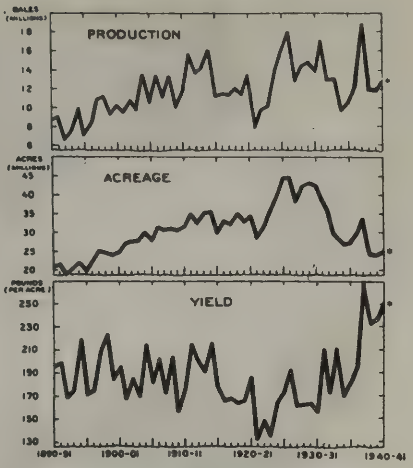
COTTON, UPLAND: PERCENTAGE OF GINNINGS SHORTER THAN 15/16 INCH, BY DISTRICTS, 1940-42 AVERAGE*

FIGURES INDICATE PERCENTAGE OF GINNINGS SHORTER THAN 15/16" FOR DISTRICTS. STAPLE LENGTHS FROM F. D. A. "DATA BY GRADE AND STAPLE DISTRICTS. EXCEPT ARIZ., CALIF., FLA., MO., N. MEX., AND VA., BY STATES. ILL. AND KY. CONSIDERED SINGLE UNIT. KANSAS CONSIDERED SAME AS ADJACENT DISTRICT IN OKLAHOMA.

U. S. DEPARTMENT OF AGRICULTURE NEG. 43300 BUREAU OF AGRICULTURAL ECONOMICS

Production of cotton having a staple length of less than 15/16" is much more important in Texas, Oklahoma, Alabama, Georgia, and Tennessee than elsewhere in the Belt. Of the total short staple cotton produced during the past 3 years, over 90 percent of it was from these 5 States, even though their total production of cotton was only 50 percent of the United States total. The percentage of cotton under 15/16" ranged from less than 1 percent in some districts of Mississippi and Louisiana to over 80 percent in western Texas.

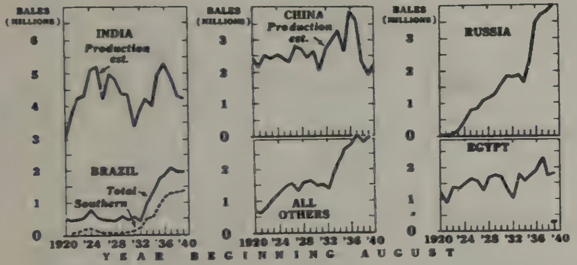
Cotton: Production, Acreage, and Yield, United States, 1890-1940



• ESTIMATED SEPT. 1

U. S. DEPARTMENT OF AGRICULTURE NEG. 20577-B BUREAU OF AGRICULTURAL ECONOMICS

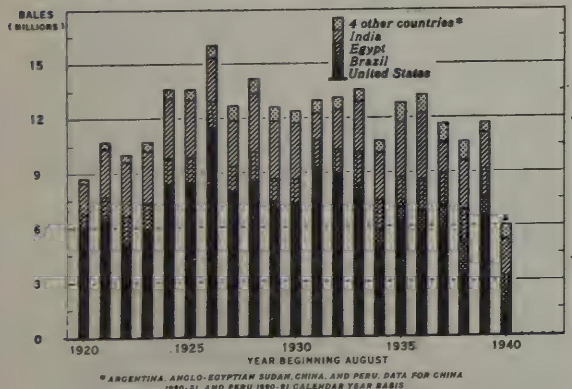
Cotton: Production in Foreign Countries, 1920-40



U. S. DEPARTMENT OF AGRICULTURE NEG. 20323-B BUREAU OF AGRICULTURAL ECONOMICS

Cotton production in India, China, and Egypt, has declined since 1936 or 1937. This is to a considerable extent accounted for by the lower prices which have prevailed for the most part since 1936. In Brazil and a number of the smaller producing areas, production has been about maintained despite lower prices.

COTTON: EXPORTS FROM SPECIFIED COUNTRIES, 1920-40



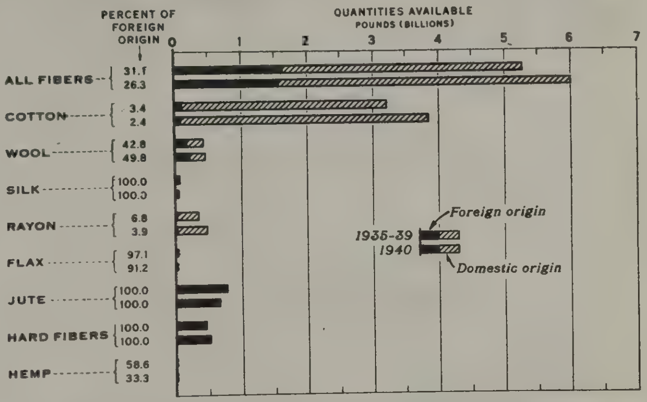
* ARGENTINA, ANGLO-EGYPTIAN SUDAN, CHINA, AND PERU. DATA FOR CHINA 1920-31, AND PERU 1920-31, CALENDAR YEAR BASIS

▲ PARTIALLY ESTIMATED

U. S. DEPARTMENT OF AGRICULTURE NEG. 39990 BUREAU OF AGRICULTURAL ECONOMICS

LARGELY BECAUSE OF THE WAR, EXPORTS FROM EIGHT OF THE LEADING EXPORTING COUNTRIES WERE ONLY ABOUT ONE HALF AS LARGE IN 1940 AS IN 1939. THEY MAY BE EVEN SMALLER IN 1941. THERE WERE WIDE VARIATIONS IN THE CHANGE IN EXPORTS FROM INDIVIDUAL COUNTRIES BETWEEN 1939 AND 1940. INCREASED PRICE DISPARITIES BETWEEN AMERICAN AND FOREIGN GROWTHS WERE LARGELY RESPONSIBLE FOR A MUCH GREATER THAN PROPORTIONATE DECLINE IN EXPORTS FROM THE UNITED STATES. THIS AND OTHER FACTORS WERE RESPONSIBLE FOR LARGER EXPORTS FROM THE ANGLO-EGYPTIAN SUDAN, ARGENTINA, AND BRAZIL IN 1940 THAN IN 1939 WHILE EXPORTS FROM THE UNITED STATES DECLINED 82 PERCENT.

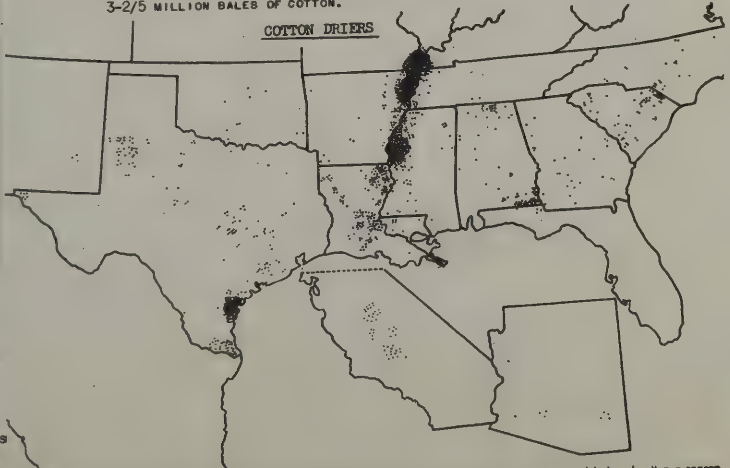
FIBERS (DOMESTIC AND FOREIGN) AVAILABLE TO ULTIMATE CONSUMERS OF THE UNITED STATES, AVERAGE 1935-39, AND 1940



U. S. DEPARTMENT OF AGRICULTURE NEG. 39954 BUREAU OF AGRICULTURAL ECONOMICS

NEARLY ONE-THIRD OF THE TOTAL QUANTITY OF FIBERS USED IN THE UNITED STATES IMMEDIATELY PRIOR TO THE BEGINNING OF THE PRESENT WAR WAS OF FOREIGN ORIGIN. THE ANNUAL AVERAGE QUANTITY OF IMPORTED FIBERS USED FROM 1935 THROUGH 1939 WAS EQUIVALENT ON A POUND-FOR-POUND BASIS TO 3-2/5 MILLION BALES OF COTTON.

COTTON DRIERS



Distribution of cotton driers, 1940-41. Each dot represents a drier that handles from 500 to several thousand bales of cotton a season. More than 1,300 driers were in use in the 1940-41 ginning season.

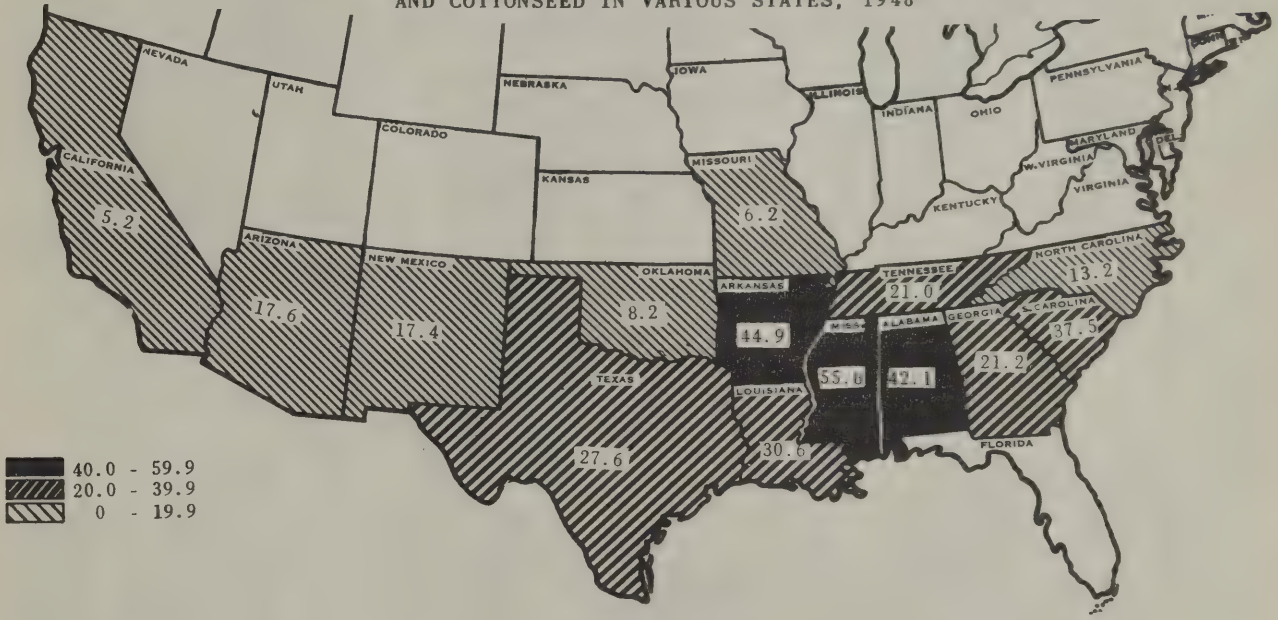
COTTON FACTS

Cotton accounts for more of the cash returns from farm products in 12 states than any other one crop, although it only represents 8.1 per cent of sales over the country as a whole. Sales of cotton and cottonseed in 1948 amounted to approximately 2½ billion dollars.

Cotton provides employment -- and thus a living -- for more farm people than any other crop. One-fifth of the farm people in the U.S. live on cotton farms.

The map below shows the per cent of total agricultural marketings, both livestock and crops, that is provided by cotton in various states. It reaches its highest point in Mississippi, where the sale of cotton and cottonseed amounts to 55.8 per cent of total farm receipts.

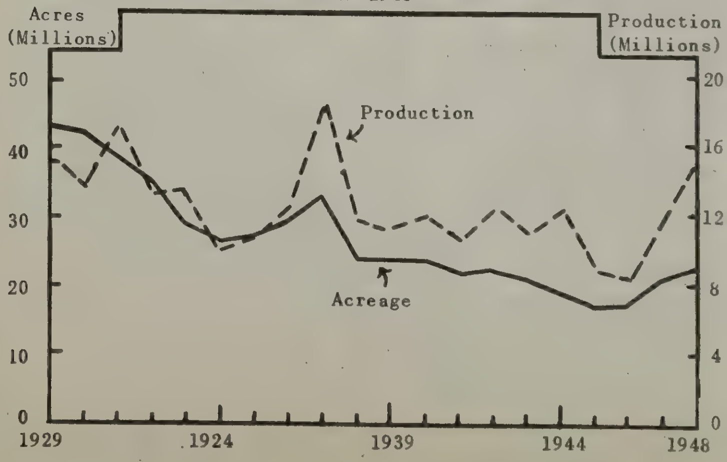
PER CENT OF FARM INCOME DERIVED FROM THE SALE OF COTTON AND COTTONSEED IN VARIOUS STATES, 1948



Cotton acreage has declined sharply over the past 20 years -- but the trend of production has been relatively level.

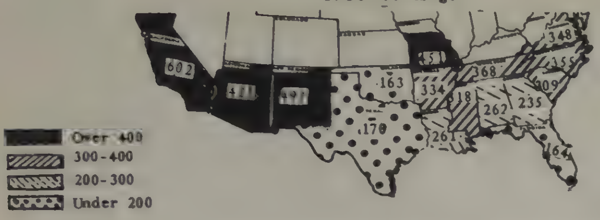
In 1929 a little over 43 million acres of cotton produced 14,825,000 bales. In 1948 slightly over half this acreage, 23 million acres, produced 14,868,000 bales. Acreage under the old AAA program was cut 38 per cent, production fell only 17 per cent.

COTTON ACREAGE HARVESTED AND PRODUCTION, U.S. 1929-1948



1948 PRODUCTION			1948 ACREAGE		
Mo.	--	506,000 Bales	Mo.	--	526,000
Va.	--	24,000	Va.	--	24,000
N. C.	--	678,000	N. C.	--	718,000
S. C.	--	871,000	S. C.	--	1,130,000
Ga.	--	745,000	Ga.	--	1,398,900
Fla.	--	15,000	Fla.	--	26,000
Tenn.	--	670,000	Tenn.	--	750,000
Ala.	--	1,197,000	Ala.	--	1,620,000
Miss.	--	2,353,000	Miss.	--	2,540,000
Ark.	--	1,982,000	Ark.	--	2,340,000
La.	--	756,000	La.	---	933,000
Okla.	--	374,000	Okla.	--	1,030,000
Tex.	--	3,150,000	Tex.	--	8,750,000
N. Mex.	--	236,000	N. Mex.	--	213,000
Ariz.	--	328,000	Ariz.	--	274,000
Calif.	--	968,000	Calif.	--	804,000
Others	--	15,000	Others	--	17,000
U. S.	--	14,943,000	U. S.	--	23,003,000

COTTON MECHANIZATION



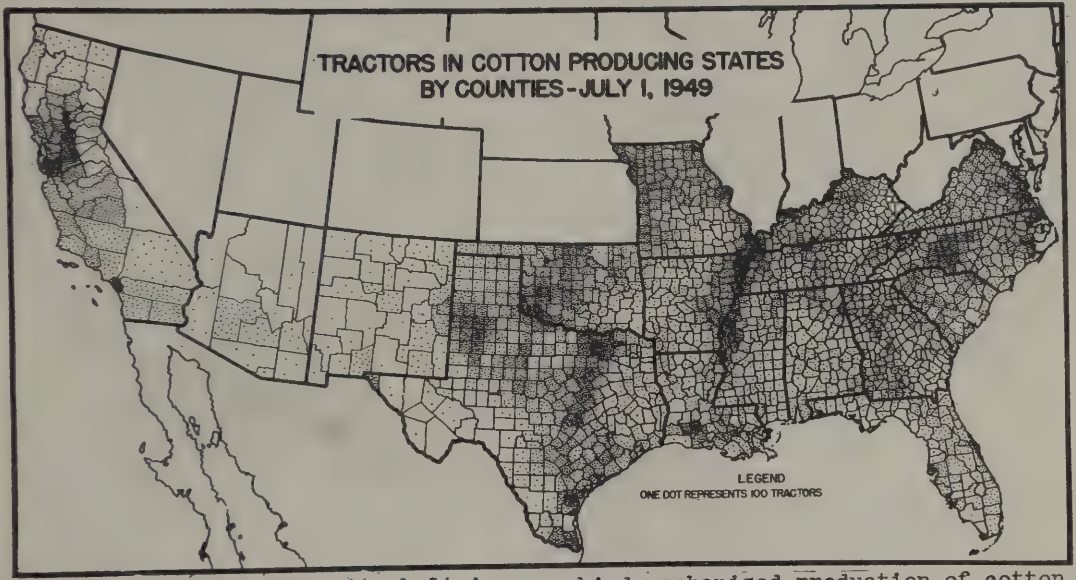
COTTON YIELD PER ACRE
1938-47 Avg.

Yield of cotton per acre has shown a steady increase over the past 20 years but the big boost came with acreage allotments under the AAA in the '30's. When acres were cut, farmers poured on more commercial fertilizer to up the production per acre.

The average yield per acre for the 10-year period, 1938-47 was 254.0 pounds of lint per acre. In 1948, the yield hit 313.1 pounds per acre.

The mechanization of cotton production is advancing at a fast pace, as shown by the big increase during the last few years in the number of tractors on cotton farms.

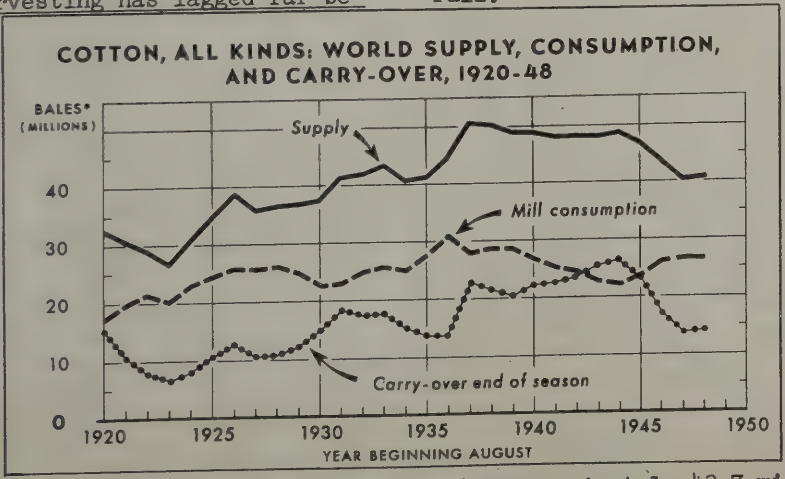
On July 1, 1949 there were an estimated 638,357 tractors on farms in the 10 major cotton producing states. This is 53 per cent over 1945 and 174 per cent over 1940.


TRACTORS IN COTTON PRODUCING STATES
BY COUNTIES-JULY 1, 1949
LEGEND
ONE DOT REPRESENTS 100 TRACTORS

Figures from across the cottonbelt indicate that tractors are being used for:

60 per cent of the seedbed preparation of cotton
54 per cent of the harrowing
45 per cent of the cultivating

Mechanical harvesting has lagged far behind mechanized production of cotton, but is now beginning to shift into second gear. It is estimated by the National Cotton Council that 8 per cent of the 1949 cotton acreage may be harvested by machines. The figure for 1948 was 5 per cent. There are approximately 3,000 mechanical spindle—type pickers and 7,000 machine strippers in the field this fall.



Production of cotton throughout the world will reach 28.7 million bales in 1949 and will exceed consumption by at least 1 million bales. World supply of commercial cotton for 1948 was 42 million bales, for 1949 approximately 43.7 million bales. World carryover on August 1, 1948 was 13.7 million bales and by August 1, 1949 had climbed to 15 million bales. U.S. carryover on July 1, 1949 was 5,283,000 bales.

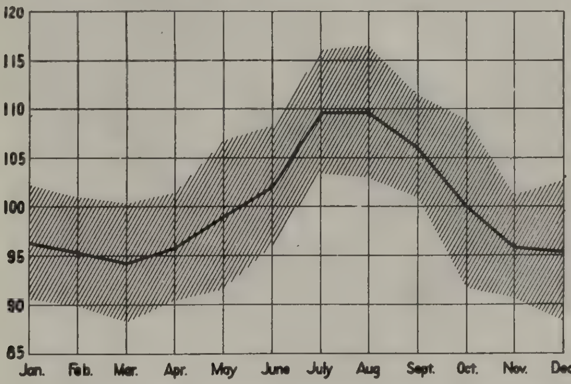
SEASONAL VARIATIONS OF PRICES AND MARKETINGS, 1921-1935

CORN

Type and Regularity of Seasonal Price Movement

The range in the fluctuations of the index of seasonal variation is greater for corn than for other grain prices. From the low level of about 95 prevailing during the winter and early spring months, the index starts a rise in May which continues until the high point of 111.3 is reached in August. The index of irregularity of 6.6 is occasioned largely by differences in type of movement in individual years. The high occurred 8 times in either July or August and the low 7 times in 15 years in one of the 4 months, February to May

During the first part of the crop year, November through May, the number of times the price increased from month to month was not significantly different from the number of times it decreased. The price in July increased 12 times, and the price in October decreased 13 times during the 15-year period. While the tendency exists for prices to rise from the harvest period to early summer, the movement in particular years is governed by conditions peculiar to the year. The movement during the latter part of the season is dominated by the amount of old corn stocks and the new crop prospects.



CORN: INDEX OF AVERAGE SEASONAL VARIATION OF THE PRICE OF No. 3 YELLOW, CHICAGO, 1921-1935

Market Movement and Utilization

The receipts of corn at primary markets for the period 1930-1935 averaged about 10 per cent of that part of the total crop produced for grain. The bulk of receipts reaches the market during the months of December to March. The seasonal index of receipts reaches a high of 128.0 in December and a low of 76.7 in May, a resulting range of 51.3. The index of irregularity is large and is in part due to the tendency of farmers to hold corn longer in certain years

The gains and losses from the storage of corn computed on the basis of No. 3 yellow corn at Chicago and the increases and decreases in quantities in the reported visible supply show a range from a loss of 17.2 million dollars in 1926-27 to a gain of 15.7 millions in 1933-34

Variations Among Years

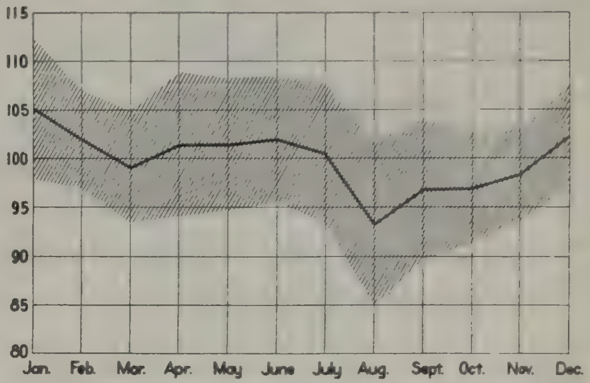
A comparison of the amplitude ratios shows the wide variations from year to year in the type of seasonal movement of both the price and the receipts of corn. It is apparent that the type of seasonal movement of price is not related to that of receipts.

The seasonal movement of the price of corn varies widely from year to year because factors unrelated to seasonal apparently dominate the movement. No uniform policy relative to holding can be established which will insure maximum gains in all years. A rather common opinion has prevailed that a large supply of corn is followed by a greater than average seasonal rise in prices, and small supplies by less than the average rise. The reasoning is that a relatively low price during the early part of the season results in heavy consumption of corn at that time, thereby reducing the supplies expected to be available for consumption later in the season and causing a greater than the average seasonal rise. Small supplies and a relatively high price would produce the opposite effect. An examination of the relationship between the change in corn prices from December and January to April and May indicates that little reliance can be placed on the size of the crop as the sole means of forecasting the movement of price during this period of the year.

OATS

Type and Regularity of Seasonal Price Movement

The index of seasonal variation for oats reaches its low of 93.3 in August, then rises to a high of 105.2 in January, and subsequently declines irregularly to the August low. The index of irregularity with an average magnitude of 6.4 is somewhat more than half the total range of 11.9 in the index of seasonal variation. No one month is characteristically either the high or low, eight different months being high and eight low in at least one year of the period. Examination of the direction of change from the preceding month also indicates considerable variability in the seasonal movement. Only in the months of March and August with declines and December with increases is there a marked predominance in the direction of the change from the preceding month



OATS: INDEX OF AVERAGE SEASONAL VARIATION OF THE PRICE OF No. 3 WHITE, CHICAGO, 1921-1935

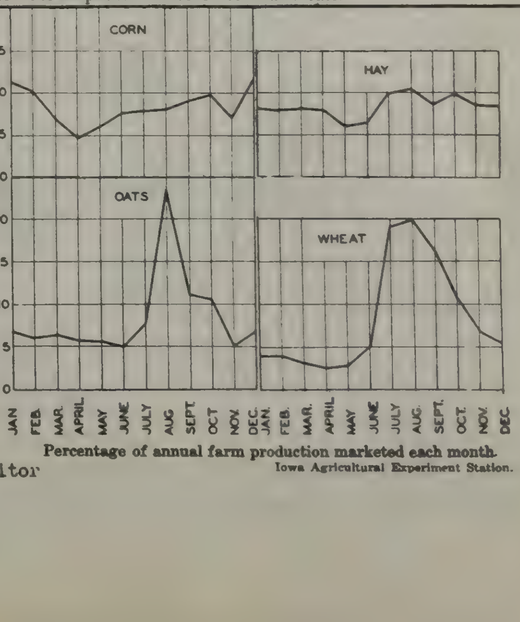
Market Movement and Utilization

Most of the oat crop is utilized on the farm on which raised. The reported visible supply in October, the usual peak, averaged only 2½ per cent of the total production in the period 1925 to 1934. Marketings are heavy immediately after harvest, the index of seasonal variation reaching a high of 221 in August, declining to about 80 by November, and remaining at about that level until the following fall

The peak in visible supply is somewhat later, usually occurring in October. Examination of the reported farm stocks on July, October, January, and April 1 indicate farm utilization to be at a fairly uniform rate throughout the year.

Variations Among Years

Little explanation has been found for the variation among years in the seasonal movement of oat prices. While the quantity of corn and its price influence the general level of oat prices in a particular year, the seasonal movements do not appear to be closely related. There is a tendency for the amplitude ratio to vary directly with the size of crop. This is probably due to the smaller interseasonal change in price occasioned by the adjustment to the new seasonal price level in the case of the smaller crops. There also appears to be an inverse relationship between the amplitude ratios of corn and oats.



Percentage of annual farm production marketed each month.

Iowa Agricultural Experiment Station.

MINNESOTA TECHNICAL BULLETIN 127

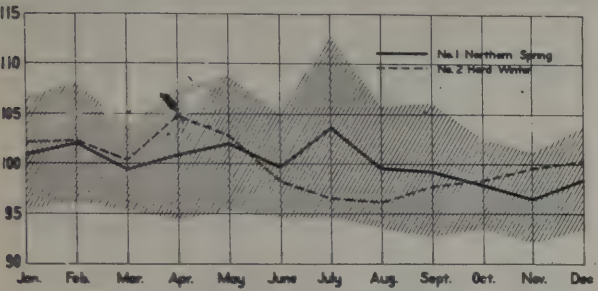
Underscoring and Selection of Reproduced Statements by Digest Editor

SEASONAL VARIATIONS OF PRICES AND MARKETINGS, 1921-1935

WHEAT

Type and Regularity of Seasonal Price Movement

The average seasonal movement in wheat prices is small, and factors unrelated to seasonal are of sufficient importance to dominate the movement in most years. The index of seasonal variation for No. 1 Northern Spring at Minneapolis has a range of about 7 points between the high and the low of the year No. 2 Hard Winter Wheat at Kansas City shows a wider fluctuation of about 9 points. In both cases, however, the index of irregularity is so large relative to the average seasonal movement as to indicate there is little typical seasonal regularity. The low of the year for No. 1 Northern Spring is usually reached in the period from July to November and the high toward the end of the crop year from May to July. The winter wheat, in general, has an earlier rise and decline than the spring wheat.



WHEAT: INDEXES OF AVERAGE SEASONAL VARIATION OF PRICES OF No. 1 NORTHERN SPRING, MINNEAPOLIS, AND No. 2 HARD WINTER, KANSAS CITY, 1921-1935

Market Movement and Utilization

Examination of the data on wheat for the physical movement and utilization of the crop disclose the manner in which the great variations in production are adjusted to a fairly regular rate of final utilization. Wheat harvest in the United States begins in June with winter wheat in the South and continues without interruption until the end of the spring wheat harvest in the Northwest in September. During the crop years from 1919 to 1929, with an average crop of 841 million bushels, farmers retained an average of about 30 per cent or 250 million bushels on their farms. Receipts at primary markets roughly indicate the movement from the farm. The bulk of the wheat is marketed shortly after harvest, the seasonal index of receipts reaching a high of 196 in July and a low of 47 in April, a resulting amplitude of 149

Variations Among Years

The price movements in particular years vary widely in the case of wheat, since the average seasonal movement is small and factors unrelated to seasonal dominate the movement.

The type of movement is largely unpredictable. Only one variety of movement appears to exhibit marked regularity. This is the sharp advance due to crop scares, which, when it occurs, tends to be overdone and a subsequent decline develops. The Wheat Studies of the Food Research Institute based on 21 crop years have shown that sharp increases tend to be followed by rather prompt and severe price declines. A sharp increase is one of 14 cents or more in the deflated average weekly prices within a period of five weeks or less (about 17 cents at a wholesale price level of 90 on the 1926 base). The character of the price decline which usually follows a price advance is closely related to the time of the rise. Crop-scare rises occurring between April and October tend to be followed by rapid declines if the rise comes early in the season and more gradual and prolonged if the rise comes later. Sharp increases occurring in the winter and preceded by two months or more of steady, moderate rise tend to be followed by precipitous declines.

Evidently gains from holding can be secured only by the proper selection of years in which to hold and can not be secured by any regular annual holding procedure.

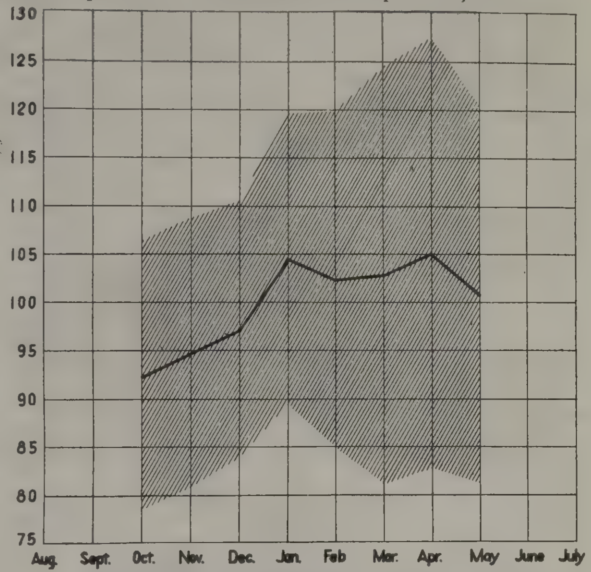
MINNESOTA TECHNICAL BULLETIN 127

Underscoring and Selection of Reproduced
Statements by Digest Editor

POTATOES

The large index of irregularity of 17.2 is greater than the range of fluctuation in the average seasonal and indicates that there is little typical seasonal regularity. During the period of 15 years, the high point was reached five times in April and four times in May. The low point occurred nine times in one of the three months, October, November, or December, and four times in April or May.

Certain definite tendencies are noted as regards the changes in prices from month to month. The October price was consistently less than the September price. The price in January was higher than the December price in 12 out of 15 years, and the February price was lower than the January price in 10 years. The tendency for the price to decline in May is in part due to the influence of the new potato shipments.



POTATOES: INDEX OF AVERAGE SEASONAL VARIATION OF THE PRICES OF ROUND WHITES, CHICAGO, 1921-1935

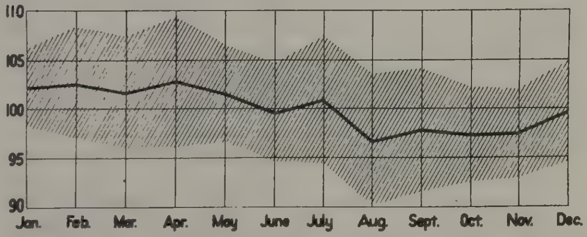
The marketing of the late potato crop is distinctly seasonal. Two peaks appear in the index, one of 202.3 in October and the other of 149.9 in March. The winter low of 86.1 occurs in December

The high point reached in the fall is due to the heavy shipments from the field soon after digging in order to avoid storage at the shipping point.

FLAX

The seasonal index of the price of No. 1 flax at Minneapolis rises from a low of 96.7 in August to a high of 102.7 in April

Both the rise during the fall and winter and the decline during the summer months are gradual.



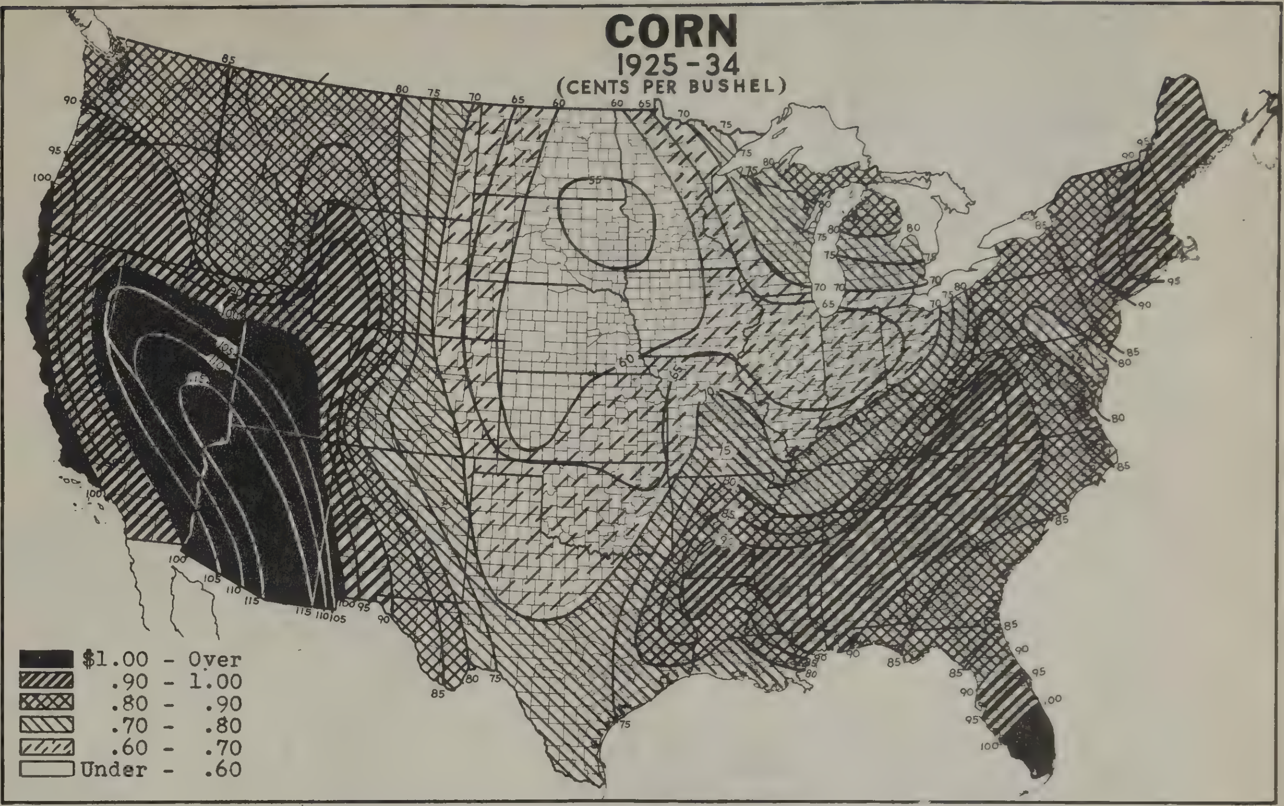
FLAX: INDEX OF AVERAGE SEASONAL VARIATION OF THE PRICE OF No. 1, MINNEAPOLIS, 1921-1935

The bulk of the flax crop is marketed soon after harvest, August to October, inclusive. The seasonal index of receipts at Minneapolis, which is the leading primary market, reaches a high of 300.1 in September and a low of 27.9 in July with a resulting amplitude of 272.2.

Flax is not utilized as rapidly as it reaches the market, and accumulated stocks serve as a means of maintaining fairly level crushing operations during the year.

The seasonal movement of flax prices is closely associated with that of linseed oil prices. The relationship indicates that changes in flax prices in individual years are a response to changes in the demand situation as represented by the prices of linseed oil.

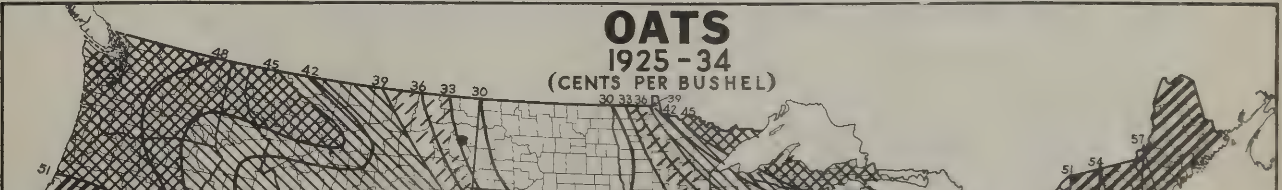
PRICE ZONES—AVERAGE PRICES RECEIVED BY FARMERS



CORN

1925 - 34

(CENTS PER BUSHEL)



OATS

1925 - 34

(CENTS PER BUSHEL)

U S DEPARTMENT OF AGRICULTURE

DOANE AGRICULTURAL DIGEST 1939

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

CORN - Average prices received by farmers for corn, by crop reporting districts, 1925-1934 (Cents per bushel)

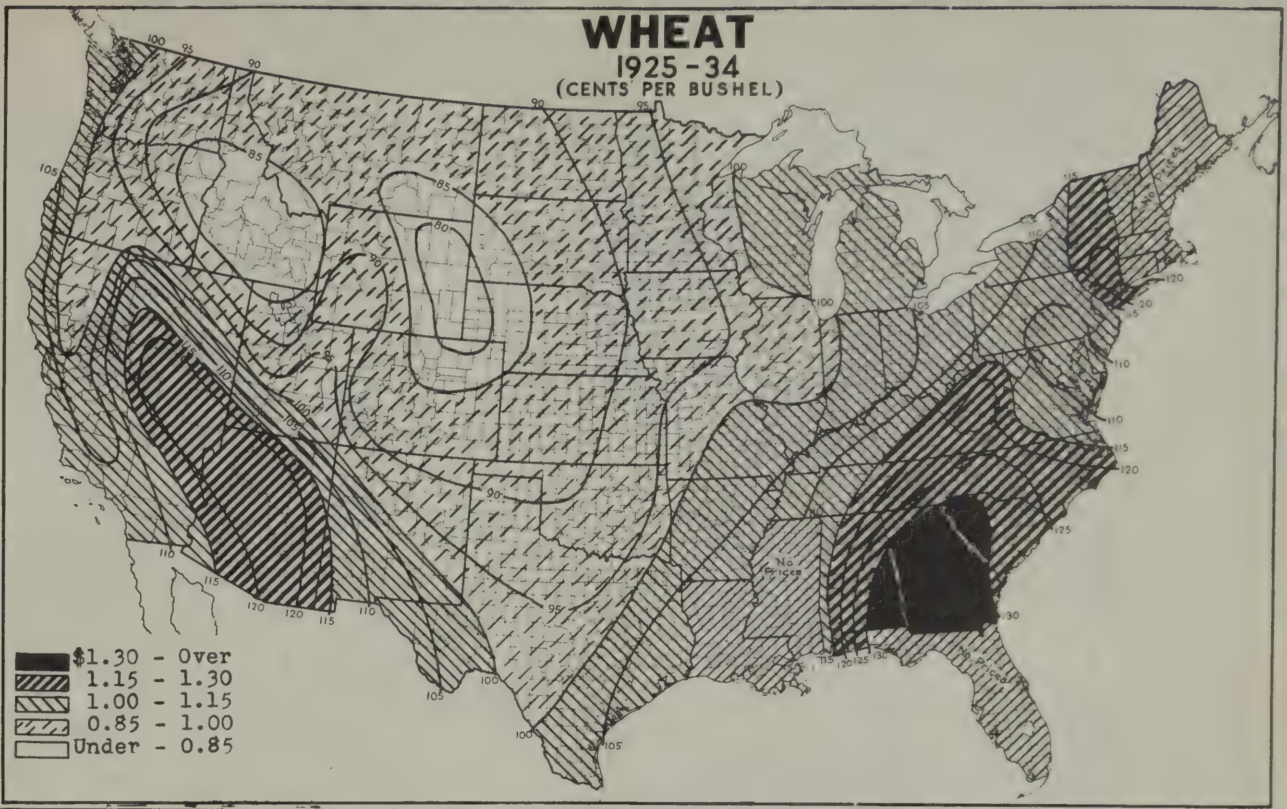
State	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	*	-	-	96	-	94	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95
New York	-	-	-	90	-	87	83	-	85	-	91	-	82	85	95	93	-	-
New Jersey	-	-	-	84	-	-	-	-	87	-	-	-	-	88	-	-	-	-
Pennsylvania	84	-	-	84	-	89	88	-	81	-	85	-	87	81	82	-	-	-
Ohio	65	-	-	68	-	77	65	-	67	-	80	-	69	75	81	-	-	-
Indiana	61	-	-	62	-	64	62	-	61	-	64	-	65	73	71	-	-	-
Illinois	63	-	-	-	-	64	63	63	62	-	61	63	66	-	67	-	-	-
Michigan	82	-	-	82	-	80	78	-	73	-	76	-	75	74	72	-	-	-
Wisconsin	71	-	-	72	-	75	71	-	73	-	74	-	72	71	72	-	-	-
Minnesota	57	-	-	61	-	*	55	-	59	-	63	-	56	57	64	-	-	-
Iowa	58	-	-	58	-	64	60	-	59	-	63	-	61	64	65	-	-	-
Missouri	69	-	-	71	-	70	67	-	74	-	73	-	68	79	67	-	-	-
North Dakota	66	-	-	56	-	59	65	-	63	-	58	-	66	63	53	-	-	-
South Dakota	62	-	-	54	-	53	66	-	59	-	56	-	63	59	59	-	-	-
Nebraska	59	-	-	62	-	60	-	-	60	-	60	-	58	59	60	-	-	-
Kansas	59	-	-	62	-	64	60	-	65	-	65	-	60	64	63	-	-	-
Delaware	-	-	-	80	-	-	-	-	76	-	-	-	-	81	-	-	-	-
Maryland	84	-	-	78	-	79	78	-	82	-	82	-	-	-	-	-	-	-
Virginia	-	-	-	87	-	-	88	-	89	-	88	-	100	94	87	-	-	-
West Virginia	89	-	-	96	-	87	88	-	102	-	96	-	-	104	-	-	-	-
North Carolina	106	-	-	93	-	84	100	-	91	-	82	-	-	94	90	-	-	-
South Carolina	99	-	-	96	-	91	99	-	84	-	-	-	-	87	-	-	-	-
Georgia	97	-	-	100	-	99	94	-	88	-	83	-	81	78	84	-	-	-
Florida	89	-	-	-	-	78	-	-	90	-	-	-	-	106	-	-	-	-
Kentucky	73	-	-	74	-	78	80	-	82	-	94	-	-	-	-	-	-	-
Tennessee	76	-	-	79	-	78	80	-	90	-	91	-	-	-	-	-	-	-
Alabama	95	-	-	87	100	94	97	-	89	-	95	-	98	92	89	-	-	-
Mississippi	88	-	-	86	-	83	87	-	92	-	91	-	88	94	95	-	-	-
Arkansas	78	-	-	89	-	80	85	-	89	-	84	-	88	90	90	-	-	-
Louisiana	93	-	-	94	-	86	93	-	79	-	87	-	79	75	79	-	-	-
Oklahoma	66	-	-	69	-	64	68	-	68	-	66	-	69	66	74	-	-	-
Texas	-	65	69	68	-	68	71	-	87	-	85	-	75	72	78	-	74	-
Montana	87	-	-	86	-	70	-	-	88	-	-	-	102	82	84	-	-	-
Idaho	82	-	-	-	-	-	-	-	-	-	-	-	84	79	87	-	-	-
Wyoming	97	-	-	75	-	100	96	-	68	-	-	-	-	-	-	-	-	-
Colorado	94	-	-	66	-	75	75	-	67	-	80	-	79	73	71	-	-	-
New Mexico	92	-	-	-	-	76	-	-	-	-	-	-	95	-	97	-	-	-
Arizona	-	-	-	126	-	-	-	-	100	-	-	-	*	-	119	-	-	-
Utah	98	-	-	-	-	-	-	-	103	-	103	-	113	-	-	-	-	-
Nevada	109	-	-	-	-	*	-	-	-	-	-	-	-	115	-	-	-	-
Washington	90	-	-	84	-	98	-	-	85	-	-	-	-	-	92	-	-	-
Oregon	97	-	-	96	-	90	-	-	-	-	-	-	102	93	-	-	-	-
California	114	-	-	*	-	*	102	-	94	97	107	-	-	101	-	-	-	-

OATS - Average prices received by farmers for oats, by crop reporting districts, 1925-1934 (Cents per bushel)

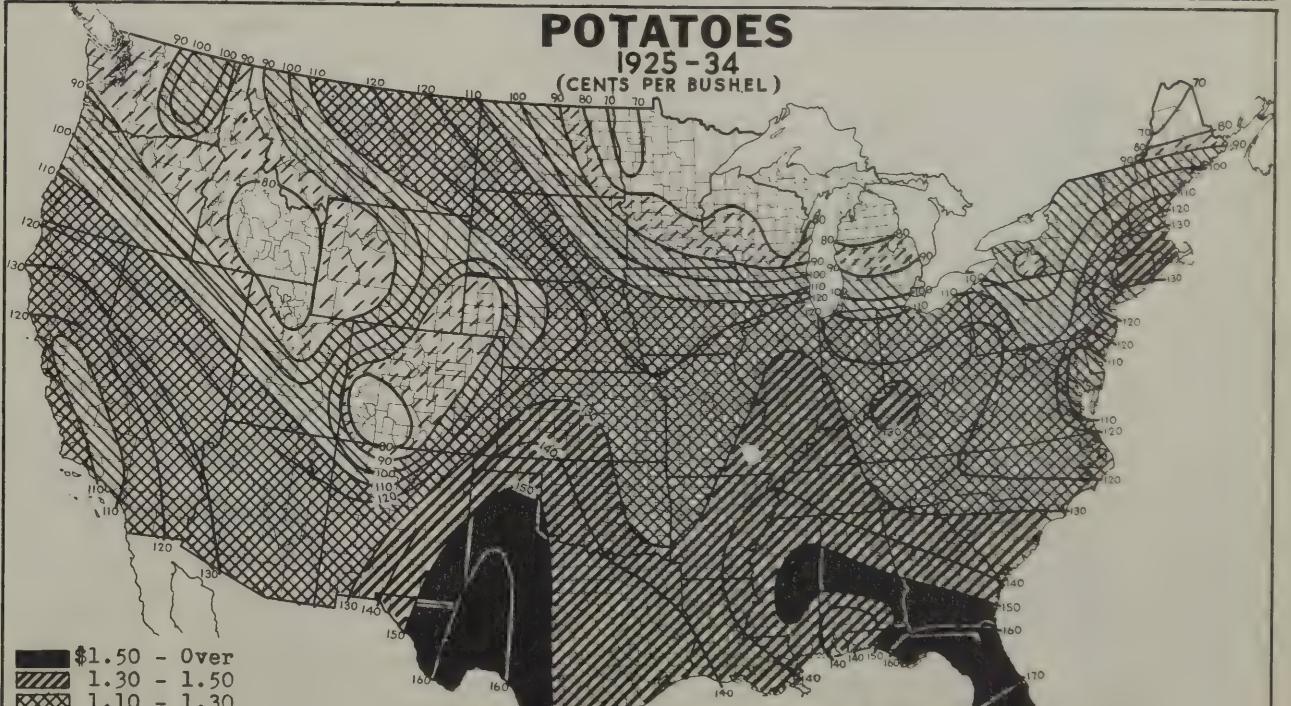
State	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	59	-	-	55	-	59	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58
New York	-	-	-	49	-	56	45	-	50	-	54	-	47	48	54	56	-	-
New Jersey	-	-	-	50	-	-	-	-	48	-	-	-	-	53	-	-	-	-
Pennsylvania	48	-	-	49	-	55	50	-	46	-	50	-	50	46	47	-	-	-
Ohio	36	-	-	38	-	43	35	-	38	-	46	-	39	43	47	-	-	-
Indiana	34	-	-	34	-	35	35	-	34	-	34	-	41	42	41	-	-	-
Illinois	34	-	-	-	-	36	34	36	33	-	33	36	41	-	40	-	-	-
Michigan	47	-	-	45	-	44	43	-	40	-	37	-	42	39	39	-	-	-
Wisconsin	38	-	-	42	-	42	36	-	39	-	38	-	41	39	39	-	-	-
Minnesota	30	-	-	41	-	45	31	-	33	-	36	-	31	33	34	-	-	-
Iowa	32	-	-	32	-	36	33	-	32	-	35	-	34	35	35	-	-	-
Missouri	39	-	-	39	-	37	38	-	43	-	43	-	39	51	43	-	-	-
North Dakota	29	-	-	28	-	28	29	-	29	-	30	-	28	30	29	-	-	-
South Dakota	32	-	-	29	-	29	36	-	31	-	31	-	38	34	32	-	-	-
Nebraska	34	-	-	38	-	33	-	-	36	-	34	-	36	37	35	-	-	-
Kansas	38	-	-	39	-	36	40	-	40	-	37	-	38	41	37	-	-	-
Delaware	-	-	-	54	-	-	-	-	55	-	-	-	-	59	-	-	-	-
Maryland	52	-	-	49	-	47	47	-	55	-	58	-	-	-	-	-	-	-
Virginia	-	-	-	52	-	-	54	-	57	-	62	-	59	62	59	-	-	-
West Virginia	5	-	-	57	-	58	55	-	61	-	60	-	-	66	-	-	-	-
North Carolina	64	-	-	54	-	68	65	-	61	-	63	-	-	63	67	-	-	-
South Carolina	66	-	-	64	-	70	65	-	65	-	-	-	-	69	-	-	-	-
Georgia	64	-	-	66	-	62	68	-	71	-	72	-	71	69	71	-	-	-
Florida	66	-	-	-	-	66	-	-	75	-	-	-	-	*	-	-	-	-
Kentucky	48	-	-	50	-	52	48	-	48	-	59	-	-	-	-	-	-	-
Tennessee	52	-	-	53	-	54	53	-	60	-	60	-	-	-	-	-	-	-
Alabama	59	-	-	61	64	63	60	-	62	-	67	-	63	69	71	-	-	-
Mississippi	55	-	-	59	-	57	58	-	61	-	57	-	60	65	64	-	-	-
Arkansas	50	-	-	58	-	54	53	-	53	-	52	-	55	55	56	-	-	-
Louisiana	59	-	-	58	-	57	58	-	61	-	60	-	57	62	61	-	-	-
Oklahoma	42	-	-	40	-	37	42	-	41	-	42	-	41	41	47	-	-	-
Texas	-	41	46	41	-	42	43	-	52	-	51	-	45	45	53	-	48	-
Montana	45	-	-	42	-	35	-	-	45	-	-	-	42	42	42	-	-	-
Idaho	41	-	-	-	-	-	-	-	-	-	-	-	44	40	41	-	-	-
Wyoming	44	-	-	45	-	50	55	-	40	-	-	-	-	-	-	-	-	-
Colorado	44	-	-	39	-	42	48	-	43	-	46	-	46	44	47	-	-	-
New Mexico	54	-	-	-	-	48	-	-	-	-	-	-	57	-	57	-	-	-
Arizona	-	-	-	68	-	-	-	-	51	-	-	-	54	-	60	-	-	-
Utah	46	-	-	-	-	-	-	-	53	-	54	-	59	-	-	-	-	-
Nevada	58	-	-	-	-	66	-	-	-	-	-	-	-	67	-	-	-	-
Washington	49	-	-	48	-	50	-	-	46	-	-	-	-	-	44	-	-	-
Oregon	44	-	-	48	-	43	-	-	-	-	-	-	53	51	-	-	-	-
California	64	-	-	54	-	56	52	-	47	47	62	-	-	55	-	-	-	-

* Data not available.

PRICE ZONES — AVERAGE PRICES RECEIVED BY FARMERS



WHEAT
1925-34
(CENTS PER BUSHEL)



POTATOES
1925-34
(CENTS PER BUSHEL)

U.S DEPARTMENT OF AGRICULTURE

WHEAT - Average prices received by farmers for wheat, by crop reporting districts, 1925-1934 (Cents per bushel)

State	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	Data not available																	
New Hampshire	Data not available																	
Vermont	Data not available																	
Massachusetts	Data not available																	
Rhode Island	Data not available																	
Connecticut	Data not available																	
New York	-	-	-	116	-	114	109	-	113	-	121	-	113	115	123	128	-	-
New Jersey	-	-	-	112	-	-	-	-	111	-	-	-	-	115	-	-	-	-
Pennsylvania	113	-	-	112	-	119	110	-	109	-	109	-	110	107	108	-	-	-
Ohio	104	-	-	106	-	109	103	-	105	-	106	-	105	106	108	-	-	-
Indiana	98	-	-	101	-	102	100	-	101	-	101	-	104	105	103	-	-	-
Illinois	96	-	-	-	-	98	99	101	96	-	94	98	105	-	104	-	-	-
Michigan	103	-	-	102	-	98	100	-	102	-	102	-	102	102	104	-	-	-
Wisconsin	99	-	-	103	-	97	97	-	102	-	101	-	103	100	103	-	-	-
Minnesota	92	-	-	94	-	*	95	-	95	-	97	-	94	95	95	-	-	-
Iowa	92	-	-	93	-	98	92	-	94	-	95	-	92	93	95	-	-	-
Missouri	97	-	-	99	-	101	96	-	100	-	103	-	96	104	103	-	-	-
North Dakota	93	-	-	90	-	93	90	-	91	-	94	-	91	92	91	-	-	-
South Dakota	88	-	-	90	-	89	86	-	92	-	90	-	83	85	91	-	-	-
Nebraska	82	-	-	89	-	89	-	-	87	-	90	-	85	87	90	-	-	-
Kansas	89	-	-	90	-	94	89	-	91	-	92	-	91	91	92	-	-	-
Delaware	-	-	-	107	-	-	-	-	108	-	-	-	-	112	-	-	-	-
Maryland	116	-	-	108	-	108	107	-	109	-	111	-	-	-	-	-	-	-
Virginia	-	-	-	111	-	-	118	-	113	-	112	-	123	120	114	-	-	-
West Virginia	114	-	-	120	-	114	110	-	125	-	121	-	-	128	-	-	-	-
North Carolina	129	-	-	123	-	114	126	-	127	-	128	-	-	125	120	-	-	-
South Carolina	131	-	-	129	-	132	135	-	124	-	-	-	-	122	-	-	-	-
Georgia	131	-	-	134	-	132	136	-	131	-	127	-	135	127	140	-	-	-
Florida	Data not available																	
Kentucky	114	-	-	112	-	113	109	-	113	-	[illegible]	-	-	-	-	-	-	-
Tennessee	112	-	-	113	-	115	116	-	122	-	123	-	-	-	-	-	-	-
Alabama	116	-	-	111	132	135	117	-	160	-	132	-	117	*	108	-	-	-
Mississippi	Data not available																	
Arkansas	102	-	-	106	-	109	113	-	111	-	100	-	106	117	*	-	-	-
Louisiana	Data not available																	
Oklahoma	[illegible]	-	-	90	-	91	90	-	92	-	94	-	92	93	92	-	-	-
Texas	-	93	97	96	-	97	101	-	107	-	106	-	101	104	108	-	105	-
Montana	86	-	-	86	-	89	-	-	86	-	-	-	90	85	86	-	-	-
Idaho	82	-	-	-	-	-	-	-	-	-	-	-	85	83	84	-	-	-
Wyoming	87	-	-	81	-	99	104	-	78	-	-	-	-	-	-	-	-	-
Colorado	77	-	-	84	-	88	88	-	90	-	92	-	88	90	91	-	-	-
New Mexico	[illegible]	-	-	-	-	91	-	-	-	-	-	-	109	-	112	-	-	-
Arizona	-	-	-	133	-	-	-	-	114	-	-	-	117	-	121	-	-	-
Utah	87	-	-	-	-	-	-	-	96	-	99	-	110	-	-	-	-	-
Nevada	114	-	-	-	-	128	-	-	-	-	-	-	-	121	-	-	-	-
Washington	103	-	-	91	-	91	-	-	88	-	-	-	-	-	86	-	-	-
Oregon	96	-	-	88	-	84	-	-	-	-	-	-	107	91	-	-	-	-
California	126	-	-	109	-	100	109	-	101	105	[illegible]	-	-	109	-	-	-	-

POTATOES - Average prices received by farmers for potatoes, by crop reporting districts, 1925-1934 (Cents per bushel)

State	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	75	-	-	101	-	113	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	121
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	112
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	128
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	129
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	129
New York	-	-	-	119	-	105	92	-	106	-	119	-	94	97	134	116	-	-
New Jersey	-	-	-	132	-	-	-	-	120	-	-	-	-	120	-	-	-	-
Pennsylvania	109	-	-	103	-	122	129	-	112	-	109	-	124	111	113	-	-	-
Ohio	111	-	-	113	-	116	117	-	124	-	129	-	135	128	127	-	-	-
Indiana	115	-	-	110	-	107	126	-	123	-	122	-	130	119	125	-	-	-
Illinois	123	-	-	-	-	125	128	131	130	-	130	131	126	-	127	-	-	-
Michigan	91	-	-	78	-	78	80	-	81	-	85	-	94	96	102	-	-	-
Wisconsin	80	-	-	85	-	81	89	-	77	-	89	-	103	98	103	-	-	-
Minnesota	68	-	-	75	-	95	87	-	88	-	79	-	97	100	93	-	-	-
Iowa	112	-	-	109	-	115	119	-	120	-	118	-	121	128	124	-	-	-
Missouri	115	-	-	124	-	127	118	-	129	-	129	-	115	133	127	-	-	-
North Dakota	94	-	-	87	-	71	108	-	96	-	79	-	121	113	90	-	-	-
South Dakota	132	-	-	108	-	83	127	-	118	-	100	-	94	126	120	-	-	-
Nebraska	89	-	-	107	-	115	-	-	108	-	117	-	118	123	126	-	-	-
Kansas	129	-	-	130	-	118	148	-	133	-	121	-	149	141	126	-	-	-
Delaware	-	-	-	129	-	-	-	-	107	-	-	-	-	98	-	-	-	-
Maryland	111	-	-	118	-	118	116	-	123	-	100	-	-	-	-	-	-	-
Virginia	-	-	-	125	-	-	126	-	129	-	108	-	113	119	120	-	-	-
West Virginia	131	-	-	127	-	123	127	-	126	-	119	-	-	136	-	-	-	-
North Carolina	105	-	-	134	-	119	115	-	125	-	121	-	-	126	130	-	-	-
South Carolina	145	-	-	139	-	140	152	-	138	-	-	-	-	126	-	-	-	-
Georgia	148	-	-	126	-	141	152	-	152	-	141	-	157	157	136	-	-	-
Florida	172	-	-	-	-	173	-	-	161	-	-	-	-	179	-	-	-	-
Kentucky	136	-	-	136	-	131	136	-	136	-	120	-	-	-	-	-	-	-
Tennessee	145	-	-	146	-	132	129	-	126	-	127	-	-	-	-	-	-	-
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Mississippi	142	-	-	149	-	146	149	-	157	-	159	-	144	156	148	-	-	-
Arkansas	123	-	-	134	-	136	129	-	131	-	144	-	131	143	144	-	-	-
Louisiana	142	-	-	149	-	152	142	-	142	-	122	-	155	131	128	-	-	-
Oklahoma	144	-	-	135	-	124	149	-	139	-	124	-	142	131	132	-	-	-
Texas	-	157	160	165	-	152	147	-	144	-	158	-	164	155	142	-	149	-
Montana	89	-	-	116	-	114	-	-	111	-	-	-	91	107	131	-	-	-
Idaho	87	-	-	-	-	-	-	-	-	-	-	-	81	77	75	-	-	-
Wyoming	88	-	-	115	-	117	105	-	88	-	-	-	-	-	-	-	-	-
Colorado	104	-	-	87	-	83	82	-	105	-	90	-	84	83	100	-	-	-
New Mexico	136	-	-	-	-	140	-	-	-	-	-	-	127	-	149	-	-	-
Arizona	-	-	-	169	-	-	-	-	191	-	-	-	*	-	182	-	-	-
Utah	76	-	-	-	-	-	-	-	85	-	87	-	92	-	-	-	-	-
Nevada	108	-	-	-	-	120	-	-	-	-	-	-	-	130	-	-	-	-
Washington	85	-	-	86	-	101	-	-	100	-	-	-	-	-	87	-	-	-
Oregon	90	-	-	97	-	85	-	-	-	-	-	-	113	102	-	-	-	-
California	130	-	-	127	-	120	119	-	121	110	141	-	-	124	-	-	-	-

U. S. DEPARTMENT OF AGRICULTURE

* Data not available.

SOYBEAN FACTS

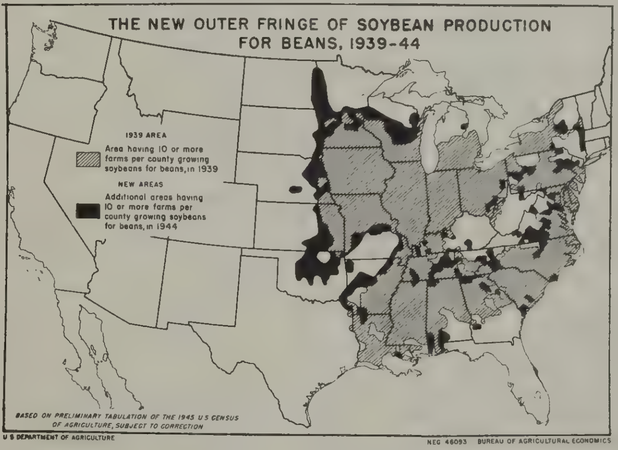
FACTS AND PROSPECTS

Soybeans are veteran competitors. Ever since their arrival in America, they have been forced to compete with well-established, highly profitable cash crops for a place in our agricultural economy. In the last twenty years soybean production has jumped from 5,000,000 to almost 200,000,000 bushels.

Versatility has been a great ally of the soybean. Its uses in livestock feed, oil, and synthetics have provided outlets capable of paying prices high enough to compete on an equal basis with such king crops as corn and cotton. The industry is now wondering how long this condition will continue.

WHERE THEY ARE GROWN

The accompanying map shows old and recent areas of soybean cultivation. Newly adapted varieties are extending the areas in which they can be profitably grown.



THE NEW OUTER FRINGE OF SOYBEAN PRODUCTION FOR BEANS, 1939-44
1939 AREA
Area having 10 or more farms per county growing soybeans for beans, in 1939
NEW AREAS
Additional areas having 10 or more farms per county growing soybeans for beans, in 1944
BASED ON PRELIMINARY TABULATION OF THE 1945 U S CENSUS OF AGRICULTURE, SUBJECT TO CORRECTION
U S DEPARTMENT OF AGRICULTURE
NEG 46093 BUREAU OF AGRICULTURAL ECONOMICS

The major soybean-growing region is the Corn Belt, principally because of the high per-acre return soybeans produce. They are well adapted to the Corn Belt climate, and cultivation practices are so similar to corn that no great change in cultural methods is necessary. Periods of peak labor load do not necessarily correspond with those of corn, and soybeans are useful in controlling the corn borer. Finally, soybean meal has proved to be of high value in livestock-feeding operations, a very important factor in the Corn Belt. Good soybean hay is the equal of most clover hay.

Soybeans are also widely grown in the South, where they grow in competition with an arch rival --cotton--which is versatile along several of the same lines. Both crops function as feed and oil crops. They differ mainly in their industrial uses: Cotton provides fiber and seed; the soybean, seed only. Soybeans compete with cotton successfully because they are a fair alternate cash crop (though not to the same extent as in the Corn Belt), they are handy in certain rotations, they provide a leguminous forage from comparatively acid soils, they are highly disease-resistant, and they "pinch-hit" for cotton when cotton planting plans go awry for some reason or other. Chemurgic research is producing synthetics from soybeans on a commercial scale.

MORE OR LESS?

The soybean has two advantages that guarantee it a large market until a better crop comes along: high digestible protein content, and an oil of many uses. The protein portion is being accepted in a rapidly expanding market as a cheaper, but completely satisfactory, livestock feed supplement. The oil has found wide acceptance in oleomargerine and shortening, which in the past few years have absorbed about 75 per cent of the total supply, and also in paints and varnishes. "...There is growing evidence and confidence that the demand for soybean products will continue unabated. . . The feeling is persistently strong that this broad demand for soybean products can be met at price levels which will permit the soybean processor to pay the grower an attractive price." --Whitney H. Eastman, Soybean Digest, Sept., 1946.

Another authority, A.G. Norman, has a different slant: "The future acreage of soybeans in this state (Iowa) will depend largely on the demand, and the price and yield relationship with respect to corn. . .Ultimately, however, when oils and fats are in better supply, there may well be a substantial reduction in soybean acreage. . ."

The future size of the soybean industry will depend upon which of these two opposing influences gains the upper hand. On the negative side is the possibility of competition from foreign oils accompanied by the return of the pre-war over-supply of fats and oils. Opposing this is the possibility of the soybean further gaining ground at the expense of competing crops (cotton, flax, peanuts) and capturing enough new markets to compensate for a general drop in farm prices. Cotton and flax are extremely vulnerable, and the peanut industry seems to lack the aggressiveness that is characteristic of the soybean industry. In general, the outlook is bright for soybeans.

MORE BEANS PER ACRE

The average yield per acre of soybeans has risen from 11 bushels per acre in 1924 to 20 bushels per acre in 1946. The application of new knowledge and cultural practices, not yet common knowledge, will increase yields even more.

FERTILIZER - Experiments indicate that, despite the nitrogen-fixing abilities of the soybean plant, it derives only about 20 to 30 pounds of nitrogen per acre from the air--the remaining 60 to 80 pounds come from the soil. Since it has long been known how poorly the soybean usually reacts to phosphorous and potassium fertilizers, it seems as though nitrogen may be the critical element.

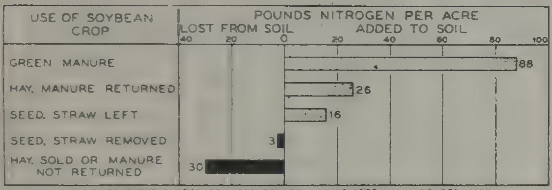
It has also been found that there is a critical time, approximately mid-season, when nitrogen (and possibly phosphorous and potassium) should be available to the plant. Side-dressing at this time has raised yields considerably.

SOYBEAN FACTS

(Continued)

ROTATION - The soil, after soybeans, is usually in a loose, broken-up condition. This is a distinct advantage, even on gentle slopes, if in the fall small grain follows the soybean harvest immediately in order to pin this loose soil down against washing, and also to make immediate use of the highly soluble nitrogen fixed on the roots of the soybean plant, much of which would otherwise leach out of the soil by the following spring. ". . .on the Clarion and Webster soils of the north-central part of the state (Iowa), corn following soybeans out-yields corn following corn by 8-9 bushels. . .In some instances the differential was quite large, particularly on the finer-textured soils." It is Norman's opinion that these increases can be attributed largely to the favorable effect of soybeans on soil structure.

It would be a mistake, however, to get the idea that crop rotation automatically increases or even maintains soil productivity over a long period. Soybeans actually deplete nitrogen and many other soil elements under typical farm operations.



BASIS: 20 BUSHELS SEED OR 4,500 POUNDS HAY OR GREEN MANURE PER ACRE

—Nitrogen additions and losses where soybean crops are used in different ways

"Straw of an average soybean crop is worth $2.60 an acre (in nitrogen). . ." -- Purdue Univ.

PRODUCTION COSTS "There is every indication that the cost of producing soybeans will increase because farmers have been robbing their soils of fertility by growing such large acreages of soybeans and other soil-depleting grains. . ." This has not yet become apparent because of increasing yields of new varieties and better-than-average weather conditions.

Twenty-two years of cost accounts from a selected group of farmers in Illinois in cooperation with the University of Illinois throw light on the cost trends in soybean production.

"The operating expenses in the cost of producing soybeans averaged $15.20 an acre in the three years 1922-42 and when a land charge was added the total cost per acre equaled $29.30. From this point costs declined until they reached the low in 1932-1934 of $6.80 an acre for operating expenses and $15.09 for total costs. With the upward movement of the general price level following the early 1930's the operating expenses in producing an acre of soybeans rose in 1941-1943 to $10.21, and the total acre-costs to $18.36. The total cost of producing a bushel of soybeans in the three periods mentioned above was $1.48, $.58, and $.69, respectively.

". . .these costs are much below a fair market price for beans. . .Soybeans next to corn are the most profitable staple grain crop in the central corn belt, but the farmer must reckon the returns from the rotation as a whole, and the more profitable crops must carry the less profitable ones necessary to a good rotation."1/

The heavy soybean producing states have begun to publish studies of soils to determine which are adapted to soybean culture. When the almost inevitable decline in soybean acreage sets in as the oils and fats situation eases and brings prices down, growers in areas not particularly adapted to soybeans should consider carefully the prospect of trying to compete with producers in more favorable areas. Profit margins are always wiped out first in relatively non-adapted regions.

DISEASES It takes time for comparatively new crops to develop disease problems. Soybean diseases are many, but only two, sclerotial or southern blight and nematode diseases, both in the South, have ever reached epidemic proportions. Control of the wide variety of diseases is based primarily on indirect methods, with only an occasional direct attack on the disease organism itself. The main methods now practiced are: 1) use of disease resistant varieties, 2) crop rotation, 3) seed treatment, and 4) exclusion of diseased foreign seed. U.S.D.A. Farmers' Bulletin No. 1937, "Soybean Diseases and their Control", is a detailed source of information on specific diseases.

CULTURAL PRACTICES ". . . the average soybean yields of Ohio, Indiana, and Illinois could be increased from the present 18 to 20 bushels per acre to somewhere between 25 and 30 bushels per acre." (J.W. Calland, Soybean Digest, Sept., 1946)

Mr. Calland goes on to summarize those practices which increase yields as gleaned from the reports of 4200 farmers in 48 principal soybean counties:

"1. A well prepared seed bed is good for an extra bushel or more.

"2. Planting in rows can be expected to give 2 bushels per acre more than planting solid and in addition saves another bushel of seed. Row plantings are generally cleaner and can be combined earlier. Winter grain can be seeded easier with less interference from straw.

"3. Timely cultivating of solid beans can be counted on for about 1½ bushels extra yield, earlier harvest and definitely less weeds on the field.

"4. Narrow rows have given 3½ bushels better yield than wide rows, and 1½ bushels more than medium rows.

"5. Inoculation will pay well on many fields and is good insurance on most fields.

"6. Well adapted improved varieties may be expected to raise yields about 20 per cent, if we can use Lincoln (beans) as a yardstick.

"7. Improved soil productivity through the use of lime, fertilizer, manure, crop residues and clover will add 4 to 6 bushels per acre.

"8. Timely harvesting may save several bushels per acre."

1/ The cost of Producing Soybeans in Illinois. Wilcox, H. R., Univ. of Ill.

PREPARING FOODS FOR THE FREEZER LOCKER

Freezing is another means by which families can preserve and store their supplies of fruits, vegetables, meats, poultry, eggs, and fish. Where efficient locker plants or home freezers are available frozen foods can be held satisfactorily for periods of 6 months to a year. These frozen products resemble fresh foods in appearance, flavor, and food value and add desirable variety to the familiar stocks of canned, salted, and cellar-stored food.

Most of the original goodness of fresh foods can be preserved in the frozen product if proper methods are used.

PREPARING ANIMAL PRODUCTS FOR FREEZER STORAGE

MEAT ANIMALS

Selection.—Thrifty, moderately fattened animals provide the most desirable meat for freezing. A good finish adds palatability to the lean, but excessive fatness is unnecessary. Select animals with the weight that will give the size of steaks and roasts desired. Popular weights are: Hogs, 200-250 pounds; calves, 150-250 pounds; steers or heifers, 600-1,000 pounds; lambs, 70-100 pounds. All animals must be healthy.

Slaughtering.—Whether slaughtering is done at home or at the locker plant a good, clean job of dressing is important. For example, the head and feet of a hog, often discarded because poorly cleaned, constitute 9 percent of the live weight of the animal. Bruised meat or meat that has become dirty in dressing or hauling does not keep well and should be trimmed off.

Chilling.—Most meat spoilage results from delayed or imperfect chilling of warm, freshly slaughtered carcasses. Spoilage germs may produce a taint within 12 to 18 hours if the carcass is not chilled promptly. Artificial refrigeration is essential if the air temperature is above 40° F. Chill-room temperatures of 33° to 36° are customary. Prevent freezing, if possible

Aging chilled meat.—Pork, veal, and poultry are cut, packaged, and frozen as soon as they are thoroughly chilled. The tenderness of beef and lamb will be increased if the meat is allowed to hang in the 33° to 40° F. temperature of the cooler for 5 to 10 days after slaughter. During this storage the connective tissue is somewhat softened. A 5-day ripening period is long enough for carcasses that are not well protected by fat or for meat held in damp coolers. Seven to 10 days appear long enough for well-fattened beef and lamb.

Cutting meat.—Since cooking methods must be adapted to the tenderness of the meat to be cooked, the proper cutting method separates the tender steaks and roasts from the pot roasts, stews, and other less tender cuts.

The size of roasts, number of steaks, amount of ground meat, proportion of fat in the sausage, and the quantity in each package must be decided by the family. Thickness of the steaks can also be suited to the owner's preference

Boning all the cuts from a side of beef or lamb reduces the storage space required in a locker about one-fourth. It also increases the cutting or processing work or charge. Trim all cuts closely to save space. Sharp edges of bone that may puncture the wrapping paper should be removed.

Pork carcasses are cut as soon as they are thoroughly chilled, usually within 48 hours after slaughter. It is customary to separate the thick, leaner hams, shoulders, and loins from the thin, fatter bacon strips and head. Surplus fat is trimmed off for lard.

POULTRY

Only healthy, plump, well-fattened birds of the age and weight suited to the family should be selected. Birds should be fasted, but allowed water, for 24 hours before slaughter. Hanging them by their feet for killing and bleeding is recommended. It prevents bruises in the meat.

Birds can be dry-picked, though "slack" scalding is an easier method for most people. The thoroughly bled birds are moved around in water at 128° F. for 30 to 60 seconds. Feathers may be still a little tight but there is no danger of overheating the skin as when 150°-160° water is used. In the latter case, feathers will slip off easily but patches of "cooked" skin may spoil the appearance and lessen the protection against drying during storage unless scalding is done carefully.

Chilled poultry may be dressed for freezing and storage in three ways:

(1) *Roasters.*—Large, well-fleshed birds are left whole. Remove the entrails, crop, neck, and feet and tie the legs and wings tight to the breast to save storage space.

After the pin feathers are removed, the clean carcass is singed, washed, and chilled, ice water being used if necessary. Overnight chilling in a room temperature of 32° to 36° F. is satisfactory. Hang the birds so they do not touch each other.

(2) *Broilers.*—Cut off the head and feet and split the young, soft-boned birds down the back. Remove the entrails and cut the bird in two pieces along the keel or breastbone

(3) *Frying and stewing fowls.*—Cut into the familiar joints or parts when they are drawn.

The giblets and neck are cleaned, washed, drained, wrapped, and frozen in a separate package. Warm giblets should not be put in the body cavity for freezing because they spoil easily, especially if chilling is slow.

Pack the chilled pieces in compact packages, wrap carefully, and freeze promptly.

PREPARING VEGETABLES FOR FREEZING

The fresh, succulent vegetables are carefully washed and prepared as for the table. That is, the peas or lima beans are shelled, the ends and strings are removed from snap beans, and the silk and tips removed from the ears of corn. The vegetables are then ready for the important process of blanching.

Successful blanching depends on: (1) Heating each piece of product sufficiently to inactivate the enzymes, and (2) heating no particle so much as to give it a cooked quality.

Vegetables should be blanched in ample boiling water in small quantities, namely, 1 gallon of boiling water to 1 pound of vegetable. Put the relatively small quantity of prepared peas or beans or other vegetable into a wire basket or other porous container, large enough to allow the vegetable to separate and float or roll in the boiling water. Bring the water to a vigorous rolling boil each time before adding vegetables. With the proportion of 1 pound of product to 1 gallon of actively boiling water (212° F.), the temperature of the water should not drop below 200° when the vegetables are put in. Under these conditions, begin to count the scalding time as soon as the vegetables are placed in the water.

Scald vegetables in large amount of water

Cool scalded vegetables

N. Mex. Ext. Bull. No. 204

Blanching time, or the number of minutes vegetables should be held in the boiling water, varies from less than 1 minute for some small peas to as much as 11 minutes for corn on the cob.

To prevent overcooking, blanched vegetables should be plunged into cold water as soon as they are removed from the scalding kettle—running water having a temperature of 50° to 60° F., or better, ice water. Don't oversoak, but use lots of water and chill the product as thoroughly as possible.

The temperature at which water boils decreases with increasing altitude. Boiling water is not as hot in the mountains as at sea level and it will not blanch vegetables as quickly. The following tabulation gives the number of minutes that should be added to the sea-level blanching time for every 2,000 feet increase in altitude.

Blanching Time at Various Altitudes

Elevation above sea level (feet)	*Time added to specified blanching schedule (minutes)*
0–1,000	None
Over 1,000 to 3,000	¼
Over 3,000 to 5,000	½
Over 5,000 to 7,000	¾
Over 7,000 to 9,000	1

Drain the scalded, chilled vegetables and pack and freeze them promptly. Moisture-vapor-resistant containers are desirable to reduce drying during freezing storage. Most vegetables are packed dry, though covering the pack with a 1½ to 2 percent salt brine (½ to 1 level teaspoon of salt per cup of water) protects against drying and delays total defrosting when the products are taken home. The amount of salt may be varied to suit individual taste. Fill the container to within 1 inch of the top with the vegetables and then barely cover the pack with cold brine. Defrost the brine pack before cooking to insure even heating. The mild, thawed brine contains some desirable food elements and should be saved and used.

Source: U.S.D.A. Circular No. 709

PREPARING FOODS FOR THE FREEZER LOCKER

PREPARING FRUITS FOR FREEZING

Unnecessary handling of fruits, particularly raspberries and ripe peaches, should be avoided, but they must be sorted for spoilage and greenness and washed carefully. Be sure that low-growing crops like strawberries are freed from dirt or sand. Prepare the washed fruit as for the table.

The use of sugar or sugar sirup for packing fruits aids greatly in maintaining the color, texture, and aroma during and subsequent to defrosting. In fact all untreated cut fruits and strawberries will discolor and acquire an off-flavor very quickly after defrosting unless they are packed with sugar or submerged in sugar sirup. When a dry-sugar pack is used, the fruit must be mixed until each piece is coated with sugar. In apricots, peaches, and nectarines, the sugar must be dissolved before packaging to prevent darkening of the fruit. Boysenberries, youngberries, and raspberries are exceptions. These can be packed dry.

Corn sirup, both the regular and the high-conversion types, can be used in place of granulated sugar (sucrose) in packing fruit. Corn sirup is not as sweet as sugar. The regular type is rated as being about half as sweet and the high conversion type two-thirds. It will therefore be necessary to use a correspondingly larger amount of corn sirup in packing fruits to obtain the same degree of sweetness as sugar when this is desired.

Dry sugar draws some moisture from the fruit. This shrinkage is of no special importance if the fruit is to be cooked in pies or preserves before being used, and the sugar pack is less liquid than sirup. Sirup-packed fruits retain their normal size and shape more completely than those packed in dry sugar and have a more natural appearance when served as dessert.

Pretreatment of fruits for freezing.—Light-colored tree fruit has a tendency to turn dark when the flesh of the fruit is exposed to the air. This can be prevented by giving the fruit certain types of pretreatment before packaging.

Apricots, nectarines, and peaches should be scalded for 30 seconds in boiling water and cooled in iced or running water for 30 seconds to remove skins. Peel, pit, and slice fruit. These fruits demand special attention, because they brown rapidly when exposed to the air. To prevent browning, the halves or slices may be treated with one of the following anti-darkening agents:

Citric acid: ¼ teaspoon citric acid to 1 quart of water. Allow slices to remain in this solution for 1 minute; then remove and package with dry sugar or sirup.

Sugar sirup (40 percent): ¾ cup sugar to 1 cup of water. Slice fruit directly into this sirup which can be used for packing.

Ascorbic acid: ¼ teaspoon ascorbic acid to 1 cup of 40-percent sugar sirup. Place slices in carton and cover with the sirup to which the ascorbic acid has been added. This treatment is very effective, but at the present time ascorbic acid is difficult to obtain and is expensive.

For packing with dry sugar a ratio of 3, 4, or 5 parts by weight of fruit plus 1 part of sugar is recommended. Mix sugar evenly through the fruit. The 4 plus 1 pack gives ample sugar protection and is not too sweet for most purposes. A 50-percent sirup is the all-around sirup, but a 40-percent sirup is satisfactory for some fruits. The 50-percent sirup is made accurately enough from equal quantities, by measure, of sugar and water. Dissolve the sugar by stirring rather than heating. Pour just enough cold sirup into the container to cover the well-packed fruit.

Sliced, crushed, and pureed fruit.—Crushed frozen fruit is an excellent flavor base for ice cream, sherbets, and beverages, for use in shortcakes and cobblers and as a sundae topping. These products make an excellent substitute for crushed fresh fruits.

Fruit can be crushed with a potato masher. An ordinary tinned sieve or a fruit press can be used for making skinless, seedless purees. Commercial equipment employing a conical screw expeller with a selection of screen sizes may also be available. Galvanized or copper screen should not be used. They may cause a metallic contamination of the fruit acids.

Combine 3 parts by weight, of sliced, crushed, or pureed fruit with 1 part of sugar and mix well. Do not beat air into the product. If it is packed in glass, care is needed not to fill the jar or bottle so full that the expanding, freezing liquid will break the narrowing shoulder or neck.

In planning the quantities of sliced, crushed, or pureed fruit for use in frozen desserts, the following may serve as a guide: Twenty to thirty percent of an ice cream or sherbet mix is fruit; the juice can be used undiluted or as flavoring for a fruit punch. A few whole berries or peach slices add attractiveness when the crushed or pureed fruit is used for the main dessert or on a sundae.

PACKAGING FOODS FOR FREEZING

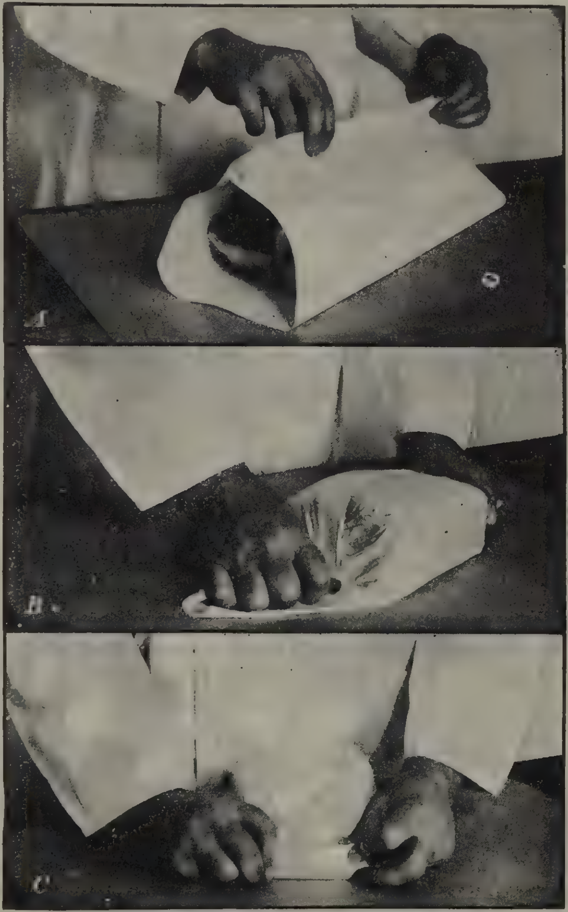
Stored frozen foods need not be sealed hermetically like canned products, but it is necessary to provide them with an efficient wrapping.

A good wrapping for frozen foods must resist the passage of moisture and vapor, be odorless and tasteless, easy to handle, seal and label, tough so that it won't crack or puncture easily at zero temperatures, economical of storage space, and cheap enough to be practical. No existing wrapper or container possesses all these qualities. Each home processor or locker-plant manager must select the one or ones best suited to the products handled, to the available storage conditions, and to the length of the intended storage period.

PAPERS FOR WRAPPING

Vapor-resistant cellophane makes an effective wrapping for frozen food. Its chief handicaps are that it is a bit expensive and hard to handle and label and needs protection from punctures and tearing.

Special, odorless waxed paper is widely used for wrapping frozen foods. Like the waxed cups, it will not prevent drying as effectively as the vapor-resistant films but it is cheaper, fairly tough, and reasonably efficient where storage periods last only a few months. The wax may crack where the paper is creased and may chafe off if not protected.



Wrapping meats: *A*, fold seam; *B*, pull paper tight to drive out air; *C*, roll ends and tie or tape ends and seam.

PACKAGING OR WRAPPING FOODS

Prepare foods for freezing and divide into such quantities as you will wish to withdraw and use at one time. Remove sharp edges or corners from meat.

Pull the paper tight against the meat, forcing out the air. Folding the two edges of the paper together as a drug-store clerk wraps a box of candy reduces air leakage through the seam. Fold the ends of the paper together and roll or fold them tight against the food.

If the wrap can be heat-sealed, so much the better. Cold-storage tape is also used to close the seams.

EMERGENCY COVERS

A home-made bag can be made by heat-sealing the edges of strips of cellophane, latex, or double-waxed paper. A strip of paper 7 by 21 inches will make a 6- by 10-inch bag with half-inch folds along the seam and a 1-inch flap at the top.

A home-made, partially vapor-resistant covering for cans or jars can be made by dipping clean muslin into melted paraffin. Spread the cloth flat, let the wax harden and cut it into squares large enough to fit well down over the top and side of the can or jar. Warm the square slightly and press it down snugly over the top of the filled can. Tie it tightly with string. This waxed cloth must be handled carefully as it cracks easily.

(Continued on Page 161.2)

CROP PLANTING TABLE

CROP	*TYPE PLANTING**	*POUNDS TO SEED PER ACRE*	*TIME TO PLANT*	*DAYS TO GERMINATE*	*PLANTING DEPTH (inches)*
Barley, spring	c.d.	72-96	April 1-25	7	½ -1½
winter	c.d.	72-96	Sept. 1-Oct. 20	7	½ -1½
Beans, Adzuki	r.	20-25	May-June-July	10	1
Field	r.	40-75	May-June-July	8	1
Dryland	r.	5-20	May-June-July	8	1
Lima	r.	120	May-June-July	9	1
Lima, Baby	r.	60	May-June-July	9	1
Mung	r.	10-15	May-June-July	7	½ -1
Tepary	r.	10-12	May-June-July	7	½ -1
Buckwheat	c.d.	36-60	June 15-July 1	6	1-2
Corn for grain	r.	6-10	May 15	7	1-2
for silage	r.	8-18	May 15	7	1-2
Corn, broom corn	r.	5-8	May 15	7	1-2
Cottonseed, fuzzy	r.	32-50	March-April-May	12	1-1½
delinted and treated	r.	16-14	March April-May	12	3/4-1
Flax for seed	c.d.	28-42	April 1-15	7	½ -1
for fiber	c.d.	84	April 15-May 1	7	½ -1
Millet, foxtail	c.d.	20-30	May 15- July 1	10	½ -1
Japanese	c.d.	20-25	May 15-July 1	10	½ -1
Millet, proso	c.d.	15-35	May 15-July 1	7	½ -1
Oats	c.d.	48-128	March 15-July 1	10	1 -1½
Field peas, large	c.d.	120-180	April	8	1 -2
small seeded	c.d.	90-120	April	8	1 -2
Pop corn	r.	3-6	May 15-June 15	10	1
Rice	c.d.	67-160	April	14	1
Rye, spring	c.d.	28-112	March 15-April 1	7	½ -2
Rye, winter	c.d.	28-112	Sept. 1-Oct. 20	7	½ -2
Sorghum, sorgo	c.d.	15-75	May-June	10	½ -1½
milo	r.	2-5	May-June	10	½ -1½
kafir	c.d.	15-45	May-June	10	½ -1½
Hegari, feterota	r.	3-6	May-June	10	½ -1½
Soybeans	c.d.	75-120	May-June	8	1 -2
small seeded	r.	15-20	May-June	8	1 -2
medium seeded	r.	20-30	May-June	8	1 -2
large seeded	r.	30-45	May-June	8	1 -2
Sugar beets unsheared	r.	18-20	April-May		1
Sugar beets sheared	r.	4-6	April-May		1
Wheat, common winter	c.d.	30-120	Sept.-Nov.	7	1 -3
spring	c.d.	30-120	March 15-April 1	7	1 -3
durum	c.d.	60-90	March 15-April 1	10	1 -3
club	c.d.	60-90	Spring or fall	7	1 -3
Spelt-Emmer	c.d.	60-90		7	1 -3

*c.d.--close drilled, r.--row crop

LEGUMES AND GRASSES

CROP	*POUNDS TO SEED PER ACRE*	*DAYS TO GERMINATE*	*PLANTING DEPTH (inches)*
LEGUMES			
Alfalfa, humid area	10-20	7	½ -1
irrigated	10-15	7	½ -1
semi-arid	8-10	7	½ -1
Black Medic	10-15	7	½
Birdsfoot Trefoil	6-12	slow	1/4 -½
Clover, alsike	7-8	7	½ -1
burr	15-20	14	½
crimson	15-25	7	½ -1

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CROP	*POUNDS TO SEED PER ACRE*	*DAYS TO GERMINATE*	*PLANTING DEPTH (inches)*
Clover (continued)			
hop	8-12	7	1/4
Ladino	½-2	7	½
mammoth	8-12	7	½ -1
red	8-12	7	½ -1
sweet	12-15	7	½ -1½
white dutch	5-7	10	½ -1
GRASSES			
Bent grass	40-60	21	½ -1
Bermuda grass	6-8	21	½ -1
Bluegrass	15-25	28	½ -1
Bromegrass	15-20	14	½ -1
Carpet grass	8-12	21	½
Crested Wheatgrass	12-20	14	½
Dallis grass	8-25	21	½
Fescue Chewing	15-40	21	½ -3/4
alta and Ky. 31	10-25	21	½ -3/4
red	15-20	21	½ -3/4
sheep	28	21	½ -3/4
Johnson grass	20-30	35	1
Oatgrass, tall	30	14	1 -1½
Orchardgrass	20-28	18	½ -1
Red Top, solid seed	6-8	10	½
unhulled	15-25	10	½
Reed Canary grass	8-12	21	½ -1
Sudan grass	20	10	½ -1
Timothy	12-15	10	½ -1

The amount of grass and legume seed needed per acre will depend much on whether it is seeded alone or in a mixture. The lower figure given is usually for mixtures. Many legumes and grasses are seldom seeded alone except for seed production. The time to plant legumes and grasses varies widely with different farming areas, climate, and soils.

VEGETABLE PLANTING TABLE

Crop	*Seed per 100 ft. of row*		*Depth Planting (inches)*	*Distance in row (inches)*	*Days required to mature from seed*	*Approximate yield per 100 ft. row*
	Seed	*Plants*				
Asparagus roots	-----	60-80	8-10	15-20	3 years	50 lbs.
Beans, Bush	1 qt.	-----	1-1½	4-6	45-65	2 bu.
Beans, Bush Lima	1 qt.	-----	1-2	4-6	50-70	2 bu.
Beets	2 oz.	-----	1	2-3	60-110	2½ bu
Brussels Sprouts	1/4 oz.	66	1/4-1/2	18-24	90-110	30 qt.
Cabbage, Early	1/4 oz.	65-80	1/4-1/2	15-18	90-120	200 lbs.
Cabbage, Late	1/4 oz.	50-65	½	24-30	100-135	250 lbs.
Carrots	½ oz.	½	2-3	60-120	60-120	1½ bu.
Cauliflower	1/4 oz.	65-80	½	18-24	100-120	60 heads
Corn, Sweet	½ pt.	35-65	1-2	18-24	75-90	4 doz. ears
Cucumber	½ oz.	20-25	1	48-72	90-130	200
Eggplant	1/4 oz.	25-50	½	18-24	150-160	125 fruits
Lettuce	½ oz.	100-300	½	4-12	60-95	25-50 lbs.
Muskmelon	½ oz.	20-25	1	60-72	90-120	90-110 mel.
Mustard	1/4 oz.	-----	1/4	2-3	60-90	2½-3 bu.
Onion Set	2 qt.	-----	1	2-3	45-75	120 bunches
Parsnips	½ oz.	-----	½-1	3-5	140-160	2 bu.
Peas	1-2 pt.	36-48	1-2	2-3	75-100	2 bu. in pods
Pepper	1/4 oz.	65-80	1/4	15-20	140-160	2 bu.
Potato, Irish	5-8 lbs.	-----	3-4	12-18	120-140	3 bu.
Potato, Sweet	-----	65-75	3-4	14-18	140-150	3 bu.
Pumpkin	½ oz.	12-15	1	80-108	90-120	75 pumpkin
Radish	1 oz.	-----	½ -1	1½ -2	30-65	100 bunches
Rhubarb Plants	-----	33	2-3	36-60	365	250-300
Spinach	1 oz.	-----	1	2-4	60-80	3 bu.
Squash, Summer	½ oz.	20-40	1	36-48	60-65	125 squash
Squash, Winter	½ oz.	15-35	1	84	125-140	75 squash
Tomatoes	1/4	25-35	1/4	36-48	150-170	4 bu.
Turnips	½ oz.	-----	1/4-½	-----	60-80	2 bu.
Watermelon	1 oz.	30	1	84-108	100-130	40 melons

PREPARING FOODS FOR THE FREEZER LOCKER

HEAT SEALING

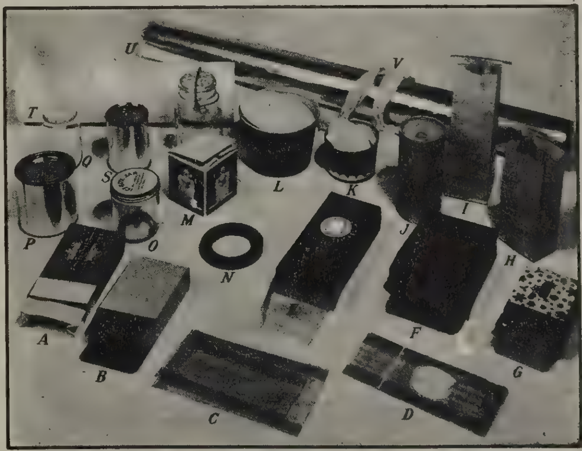
Cellophane, latex, and some double-waxed paper can be heat-sealed by heating the top fold of the bag or the seams of the package with a moderately warm flatiron or curling iron. Use just enough heat and pressure to melt the paper or wax until it seals. If too much heat is used and the seal is scorched, a new seal or a new container should be used. If heat sealing is not possible, a good fold of the edges and sticky tape (not ordinary gummed tape) can be substituted. Careful wrapping and sealing are as important as good wrapping material.

Right—Convenient method of heat-sealing cellophane bags with household iron. Left—An electric curling iron may be used, although proper control of heat is more difficult than with household iron equipped with heat regulator

The special vapor-resistant cellophanes and latex films give almost as efficient protection as glass or tin. They are economical of space, can be heat-sealed easily, and the cellophanes make practical vapor-resistant liners for the more rigid, rugged pasteboard cartons. However, these films are relatively expensive, are difficult to label unless special provision is made, and are not punctureproof or tearproof when tumbled about in the locker.

Fiber cups or bags made of odorless, specially waxed or treated stock give excellent protection against drying, although the available ones are not as efficient as latex and the special cellophanes. The waxed containers are cheaper than those made from special films and are a little easier to fill and label. The wax coating often makes a fair seal as the lid of the container is pressed into place. Hot paraffin poured around the lid or sticky tape makes an additional seal.

Bags or containers made of laminated paper and other moisture-vapor-resistant materials are satisfactory especially if provided with a locking or sealing device.



Types of vapor-resistant containers: *A*, Carton with heat-sealing bag for liner; *B*, carton with cellophane bag for liner; *C*, *D*, double cellophane bags; *E*, *F*, carton with cellophane bags for liners; *G*, cellophane-lined carton; *H*, *I*, paper bags with liners for wet and dry packs; *J*, paraffined carton; *K*, *L*, waxed cup with set-in lid; *M*, cube-shaped carton with heat-sealing top; *N*, cold-storage tape; *O*, glass jar with wide mouth; *P*, tin can with set-in friction-type lid; *Q*, *R*, glass jars; *S*, lacquer-lined tin can; *T*, waxed wrapping paper; *U*, cellophane; *V*, stockinet material.

LABELING

Identify each package or container with the owner's locker number, the kind of product, and date of storage. Special stamps, inks, and pencils are made for labeling packages of frozen food. Ordinary lead pencils will not be effective unless the writing is done on strips of cold-storage tape stuck on the waxed coverings. Tags can be tied on if there is no other way. Wrapping paper or tape of different colors can be used to identify various products or different dates of storage.

Source: U.S.D.A. Circular No. 709

DIRECTIONS FOR PREPARING SPECIFIC FRUITS AND VEGETABLES FOR FREEZING

APRICOTS

Desirable varietal characteristics.—Low browning tendency, even ripening, distinctive yellow or orange color, rich and characteristic flavor, fairly firm texture, easily separated seed, tender and smooth skin.

Harvesting.—Proper maturity is very important. Best stage is firm, ripe, with fruit showing characteristic yellow color and practically no green, while fruit gives slightly when pressed with the thumb but is not soft or mushy.

Handling.—Prompt handling with a minimum of bruising or mechanical injury is essential since ripening proceeds rapidly at usual summer temperatures.

If delay is expected, keep in coolest place at hand, cool in cold or ice water, or hold at about 32° F. with a relative humidity of 85 percent, but do not keep longer than 10 days.

Preparation.—Sort, wash, halve, and pit. Sizing of halves in different containers is not necessary unless they show a wide variation. Peeling is not necessary, except for crushed or sliced fruit. To peel, scald for 15 to 30 seconds in boiling water and cool immediately; skin will then come off readily if fruit is ripe enough.

Coarsely crushed or sliced apricots, preferably peeled and with sugar added in a 3-to-1 proportion and mixed thoroughly, make a good sundae topping.

Soft-ripe fruit pureed to a buttery consistency and packed in a 3-to-1 fruit-sugar proportion, thoroughly but carefully mixed without unduly stirring in air, makes a good flavor base for ice cream and sherbet.

Apricots darken quickly after peeling. They should be given an anti-darkening dip, if one is to be used, and packed covered with sirup or mixed with sugar immediately after halving.

Packing.—Preferable pack for apricots is with 40- to 50-percent sucrose sirup, using enough to cover the fruit. Sirup may well be chilled before it is used.

It is also possible to pack halved raw apricots mixed thoroughly with sugar (in a 5-to-1, 4-to-1, or 3-to-1 proportion). In cylindrical containers place a waxed-paper sheet over the surface to reduce oxidation, pressing the sheet down lightly in order that the sirup may coat it from below and improve the contact between fruit and the sheet.

Uses for frozen product.—Halves for pies, cobbler, fruit salad, or dessert; purees for sundae toppings, fruit ice cream, or Velva Fruit.

BEANS, LIMA

Desirable varietal characteristics.—Green seed coat, high percentage of green-colored tender beans at harvesttime, uniform maturing habit, and easily opened pods.

Harvesting.—Harvest when the pods are well filled but still succulent. Pods past the succulent stage may contain a large proportion of overmature white beans.

Handling.—Handle quickly to prevent deterioration in quality, especially after the beans have been removed from the pod; do not permit more than 2 hours to elapse between shelling and the container. If longer holding is necessary, immediately cool the beans to 35° to 40° F. by immersion in ice water, drain, and cover with cracked ice or store in the refrigerator until ready for processing.

Preparation.—Sort the shelled beans to remove the imperfect specimens and to segregate the white overmature beans from the green tender ones. The former should be packed separately for soup stock. Wash the sorted beans in clean cold water. Scald in boiling water, the small-seeded types for 1½ minutes and the large-seeded types for 2½ minutes. Thoroughly cool in running tap water, and drain.

Packing.—Pack in containers with or without the addition of 1½-percent brine as desired.

BEANS, SNAP

Desirable varietal characteristics.—Bright green or yellow pods, tender, stringless, of medium size; should not split or slough skins during freezing or lose form and color during cooking.

Harvesting.—Harvest when comparatively immature, that is, before the seeds have developed to more than two-thirds of their normal size.

Handling.—The best results are obtained with prompt handling. If necessary, the beans may be held in a locker plant at 32° F. with an 85 to 90 percent relative humidity for a few days.

Preparation.—Sort out the dull-colored and wilted pods and those showing disease and insect damage. Snap and string if necessary. The beans may be packed whole or cut, as desired. Avoid the use of iron utensils.

Scald the prepared beans in boiling water for 1½ to 2 minutes. Promptly cool in running water and drain.

Packing.—The beans may be packed in the containers with or without the addition of 1½-percent brine under average conditions of home and refrigerated-locker freezing. Rapid freezing is essential for snap beans.

BEETS

Desirable varietal characteristics.—Deep solid red color, without white rings; no woodiness; tender flesh, small size.

Harvesting.—Harvest when young and tender.

Handling.—Prompt handling is best for retention of nutritional value. If necessary, beets may be held at 31° to 32° F. with 85 to 90 percent relative humidity.

Preparation—Cut off the tops and save to use as greens. Scald in boiling water for ½ minute and cool in water quickly for easy peeling. Slice or dice into quarter-inch cubes and again scald in boiling water 2 to 3 minutes; cool in fresh cold water, and drain.

Packing.—Pack into containers and freeze without brine.

BLACKBERRIES

Desirable varietal characteristics.—Even ripening and resistance to bruising when fully ripe; lack of pronounced seediness or tough core; fleshy texture and rich flavor.

Harvesting.—Select plump berries that are fully black, with a velvet gloss rather than a shiny skin. The flavor should be sweet, and there should be no astringency. Discard rusty, reddish-colored, or poorly formed berries. Picking should be frequent so that berries of optimum maturity can be obtained.

Handling.—Handle carefully so as to avoid bruising or injury, which encourages mold growth, especially when temperatures are high. Pick in the morning, if possible, and hold in coolest place available. If delay in packing is anticipated, berries can be stored for 2 to 3 days in a locker plant at about 32° F. and 85 percent relative humidity.

Preparation.—Sorting, washing, and careful draining are essential. Blackberries intended for an ice-cream or beverage flavor base may be reduced to a seedless puree or juice, and sugar may be added in the proportion of 3 parts of fruit to 1 of sugar. The mixture should be thoroughly stirred without unduly beating in air. A mixture of coarsely crushed and whole fruit packed in a 3-to-1 fruit-sugar proportion makes a good sundae topping.

Packing.—Blackberries may be frozen on trays before packaging without sirup or sugar.

For dessert use, a sirup pack is preferable; use enough 40- or 50-percent sucrose sirup to cover the berries. For pie or jam, a sugar pack (in proportions of 5 to 1 or 4 to 1) is also feasible. Fruit packed with sugar only or with no sugar is not desirable for dessert purposes.

Uses for frozen product.—Whole berries for pies, cobbler, jam; crushed or pureed for flavor base and Velva Fruit.

BLUEBERRIES

Desirable varietal characteristics.—Tender skin, large size, sufficient acidity to give a sprightly flavor, and retention of natural bloom on surface.

Harvesting.—Follow usual practices employed for harvesting blueberries for fresh use, picking when the maximum number of berries are fully formed and colored.

Handling.—Because of their relatively slow ripening, the handling of blueberries is not difficult. A short delay requires no special precautions, provided berries are kept reasonably cool. If a longer delay is unavoidable, blueberries may be held at about 32° F. with an 85 percent relative humidity.

Preparation.—Berries should be well screened or sorted, washed, and drained. Screening should remove all immature and very small fruit as well as leaves and foreign matter.

If the berries are to be used as a sundae topping, at least part of them should be coarsely crushed and sugar added in 3-to-1 fruit-sugar mix.

Packing.—Blueberries intended for use in pies may be frozen with sirup or sugar. If berries are to be used for fresh dessert, a 40- to 45-percent sucrose sirup is desirable.

Uses for frozen product.—Pies; cobbler; in coarsely crushed form, for sauce or sundae topping.

BROCCOLI

Desirable varietal characteristics.—Dark-green color, tenderness and absence of stringiness in stalks, compact heads, and uniform maturity at harvest.

Harvesting.—Harvest before the bud clusters or heads open to the extent that the full yellow or purple color of the blossoms is distinct.

Handling.—Do not pack so tightly that adequate ventilation is impossible and stalks become ragged or torn. Best results are obtained with prompt handling. If more than ordinary delays are encountered, broccoli may be laid loosely in open crates and held in the locker plant at 32° F. with an 85 to 90 percent relative humidity for a few days.

Preparation.—Discard wilted and flabby broccoli. Sort very carefully to eliminate wormy stalks. Trim off the very large leaves. Woody stem ends should be cut off. Wash thoroughly and separate into small, medium, and large stalks. It is desirable to split very large stalks lengthwise with a knife.

Scald in boiling water: small stalks for 3 minutes; medium stalks, 3½ minutes; large stalks, 4 minutes. Cool promptly in water, and drain.

Packing.—Pack into containers, with or without 1½-percent brine as desired.

CHERRIES, SOUR

Desirable varietal characteristics.—Uniform bright-red color, even maturing on the tree, low browning tendency, sprightly acid flavor, fairly firm texture, and tender skin.

Harvesting.—Harvest at full maturity, while color is bright red; overripe cherries are usually too dark and soft, while immature cherries are too pale, lack distinctive flavor, and show handling bruises readily.

Handling.—Careful handling of fruit after harvest is essential because bruises and injuries quickly cause molding at high temperatures. Picking baskets or boxes should not be filled so full that cherries at the bottom are crushed, and picked cherries should not be jolted when being carried.

Delays in handling should be shortened as much as possible, and cherries should be kept cool. If a delay is unavoidable, prompt delivery of the fruit to cold storage at about 32° F. with 85 percent relative humidity will allow a maximum holding period of not over 1 week. Cherries rapidly lose flavor and deteriorate when held long after harvest.

Preparation.—After being sorted, washed, and drained, cherries are generally pitted before being packed. Soaking in water before pitting should not be prolonged but may make pitting easier.

Coarsely crushed, pitted sour cherries packed with sugar in a 2-to-1 or 3-to-1 fruit-to-sugar proportion are satisfactory as a flavor base for ice cream.

Sour cherry juice with sugar added (in proportions of 2 to 1 or 3 to 1) makes a good beverage flavor base.

Packing.—For pies, a pack of 5-to-1, 4-to-1, or 3-to-1 fruit-to-sugar proportion is satisfactory. The sugar should be well mixed with the fruit.

Unsugared pitted sour cherries tend to discolor rapidly during freezing and defrosting.

Uses for frozen product.—For pie and cobbler use whole pitted cherries; use coarse-crushed for ice-cream flavor base; use juice for sherbet, punch, or beverage.

CHERRIES, SWEET

Desirable varietal characteristics.—Low browning tendency, large size, firm texture after freezing and thawing, uniform maturity, tender skin, and rich flavor, with uniform color in dark types, red blush in light types.

Harvesting.—Proper maturity is essential. Fully tree-ripened cherries, picked when firm and with a "snap" in the skin, have the best flavor and suffer the least softening during freezing. Cherries should be picked riper than is usually customary for fresh use.

Cherries that are very soft when fully ripe are not satisfactory except for crushed or pulped product.

Handling.—Desirable procedure is the same as for sour cherries.

Preparation.—Customary stemming, sorting, washing, and draining are required. Pitting is not absolutely necessary for whole fruit, although pits tend to give an almondlike flavor, which may not be desirable.

Coarsely crushed, pitted sweet cherries with a distinctive flavor make a good sundae topping when packed with sugar in a 3-to-1 fruit-to-sugar proportion. Cherry juice in a 3-to-1 mix may be used as a beverage. The crushed product or the juice must be prepared and frozen with a minimum of delay in order to avoid discoloration and flavor change.

Packing.—For dessert use, pack whole cherries with 40- or 50-percent sucrose sirup. Sweet cherries packed without sugar, unless very ripe, are not generally satisfactory.

Uses for frozen product.—Whole, pitted cherries for pies, cobbler, and dessert. Crushed cherries for sundae topping, and juice for beverage base.

CORN, SWEET, WHOLE-CUT

Desirable varietal characteristics.—For yellow or orange corn, a distinctive, brightly colored kernel, tenderness of texture and kernel epidermis, uniform maturity, and deep kernels. For white corn, the same characteristics are desirable except that the color of course should be white.

Harvesting.—Harvest when the kernels are full-rounded or slightly appressed, highly colored, with a rich milky juice when pressed, and sweet in flavor.

(Continued on Page 161.4)

PREPARING FOODS FOR THE FREEZER LOCKER

Handling.—Prompt handling is necessary. For corn to be processed in a locker plant pack ears loosely to prevent self-heating. If delays in handling are unavoidable, rapidly cool the ears to 35° to 40° F. by immersing in ice water, drain, and hold at a low temperature by keeping the cooled ears covered with cracked ice or placing them in a cooler at 30° to 32° F. with 85 to 90 percent relative humidity.

Preparation.—Silk and trim the ears as for using fresh. Scald the ears in boiling water for 2 minutes and cool in fresh cold water. After this treatment, cut the corn off the cob with a sharp knife. Rinse the cut corn quickly in cold water, skimming off any chaff that rises to the surface. This treatment should be as short as possible and may be omitted if the cut corn is free from shreds of chaff.

Packing.—Pack in containers without salt solution.

CORN, ON COB

Desirable varietal characteristics.—Same as for whole-cut corn.

Harvesting.—Same as for whole-cut corn.

Handling.—Same as for whole-cut corn.

Preparation.—Silk and trim as for fresh use. Cut the ears into approximately 3-inch lengths to facilitate scalding. The ear should also be divided into small-, medium-, and large-diameter sizes.

Scald in boiling water as follows: Small-diameter, 7 minutes; medium, 9 minutes; large, 11 minutes.

Cool in fresh water and drain. Do not let stand in the cooling water longer than necessary. Corn absorbs water readily after scalding and becomes soggy. Cooling in air with a fan blowing over the material has been tried where summer-air humidities are low. In this way the amount of time for water cooling can be reduced but the material usually still requires cooling in water since air temperatures are usually relatively high.

Packing.—Wrap each ear in moisture-vapor-proof paper and twist the ends. The wrapped ears may then be frozen separately on trays or placed in paper bags or a small shipping carton for freezing, but there should not be over 2 dozen ears in one container. Ears frozen on trays may be put into shipping cartons or large cans for storage.

DEWBERRIES, INCLUDING LOGANBERRIES, BOYSENBERRIES, YOUNGBERRIES, AND SIMILAR TYPES

Desirable varietal characteristics.—In dewberries, rich purple color, distinctive flavor, soft texture and berry center (torus) and skin resistant to bruising. In loganberries, the color should be deep red and the flavor tart.

Harvesting.—Full maturity is important; the fine quality of dewberry types is not developed in immature berries, and loganberries are sour and unpalatable until ripe. Requirements, except as to color, are similar to those for blackberries.

Handling, preparation, packing, and uses.—Follow directions for blackberries.

PEACHES, CLINGSTONE

Desirable varietal characteristics.—Low browning tendency, uniform maturity, fine-grained rich yellow or orange-colored flesh.

Harvesting.—Picking at full maturity is essential for good flavor and high quality.

Handling.—Clingstone peaches are not as easily crushed as freestones, but those picked at prime maturity will not tolerate the rough handling that many picked for canning receive. A somewhat longer delay is permissible than for freestones, but if it extends beyond a day or two temperatures of about 32° F. are desirable with an 85 percent relative humidity. Storage should not extend beyond a 15-day limit.

Preparation.—Sorting, peeling, pitting, and slicing are required. The fruit is easily peeled with hot (180° F. to boiling) 2- to 5-percent lye for 45 seconds to 1½ minutes. As soon as the skin appears to have loosened, the peaches should be removed to clean cold water and the skin rubbed off with the hands until the flesh is smooth. The fruit should be thoroughly rinsed, preferably in cold running water. The pit is then removed with a pitting spoon and the halves sliced.

Packing.—The slices can be packed and frozen without sugar or sirup.

Uses of frozen product.—Pies, cooked sauce, or cobbler.

PEACHES, FREESTONE

Desirable varietal characteristics.—Low browning tendency, uniform maturity, firm fine-grained rich-yellow or orange-colored flesh, freestone and easily peeled skin. Peaches with a red color about the pit cavity make an attractive uncooked dessert.

Harvesting.—Picking at proper maturity is essential to high quality. Firm ripe stage most desirable, when skin has lost most or all of its greenish color and the flesh yields slightly under pressure of the thumb. Fruit in soft ripe stage is unsatisfactory for halving or slicing, but may be used for puree.

Handling.—Bruising must be reduced to a minimum and picked fruit should be kept as cool as possible. If there is some delay before packing, cool in cold or ice water. For longer storage, temperatures about 32° F. are desirable with an 85 percent relative humidity, but storage should not be longer than 10 days. Discoloration at the seed, mealiness, and loss of flavor result from prolonged storage.

Preparation.—Sorting, peeling, halving, and pitting are required. Ripe fruit is easily peeled after the skin is loosened by 15 to 30 seconds in boiling water. Peaches may be packed as halves, sliced, or pulped. If halved or sliced the fruit should be covered promptly with sirup in order to reduce discoloration. Peaches behave similarly to apricots and nectarines.

A mixture of coarsely crushed and sliced peaches in a well-mixed 3-to-1 sugar pack makes an excellent sundae topping. Smoothly pureed peach pulp is well mixed with sugar in a 3-to-1 fruit-to-sugar proportion for flavor base. The pulp and puree must be stirred or aerated as little as possible because of browning tendencies in many peach varieties.

Packing.—Cover the fruit halves or slices promptly with 40- to 50-percent sucrose sirup, which may well be chilled before being added to the fruit.

PEAS

Desirable varietal characteristics.—High productivity, brilliant green color when scalded, uniform size, tenderness and sweetness at optimum maturity, and easily podded. The green-skinned, wrinkle-seeded varieties are best for freezing preservation. In general, avoid the use of varieties commonly used in commercial canning, except the Thomas Laxton types which can be frozen or canned. Perfection and Surprise are two canning types that are now sometimes frozen for institutional or Army use. For use with soups or stews these types would be satisfactory if harvested at a somewhat earlier stage of maturity than is customary for canning.

Harvesting.—Harvest before the peas become overripe. Best results are obtained by harvesting when pods are well filled but not tightly filled and are bright, green, crisp, and succulent.

Handling.—Unshelled peas should not be held longer than 6 to 8 hours at ordinary atmospheric temperatures but may be stored for several days at 32° F. with 85 to 90 percent relative humidity, provided they are not stored in large masses.

In the home shelled peas should be processed at once. If this is not possible, rapidly cool the shelled peas to 35° or 40° F. by immersion in ice water, then drain, and keep covered with cracked ice during the holding period, not to exceed 24 hours; or store in the locker plant at 32° F. with 85 to 90 percent relative humidity.

Preparation.—After shelling, sort out the overlarge, hard, starchy peas, splits, skins, and debris. Wash the sorted material in clean water. Scald in boiling water for 1 minute, rapidly cool in fresh cool water, and drain.

Packing.—Pack in the containers with or without 1½-percent salt solution, as desired.

PRUNES AND PLUMS

Desirable varietal characteristics. — Uniform ripening, low browning tendency, fairly firm flesh, tender skin, lack of tendency in flesh to discolor at seed, rich flavor, and deep color.

Harvest.—Proper maturity is essential to quality. Prunes should be fully tree-ripened before harvest but not discolored at the seed. Bronze or reddish prunes are not desirable. Plums are usually best used for pulp or puree; hence full tree ripeness is essential and reasonable softness not undesirable.

Handling.—Prunes are usually quite easy to handle and are resistant to bruising. Plums are more easily bruised and injured, especially if soft ripe, and there may be molding at summer temperatures. Keep as cool as possible. Cold storage is usually not necessary for prunes and not desirable for soft-ripe plums. Prunes harvested at optimum maturity may be held at about 32° F. with 85 percent relative humidity for not longer than 2 weeks. Internal browning, wilting, and abnormal flavor may develop in long-stored prunes.

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DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

Preparation.—Usual sorting, washing, halving, and pitting are required. Peeling is not necessary.

Purees are prepared with a 4-to-1 or 3-to-1 sugar pack, thoroughly and promptly mixed in order to diminish discoloration.

RASPBERRIES, BLACK

Desirable varietal characteristics.—Minimum seediness, plumpness of berry, and juiciness of flesh, deep dark color, and large size.

Harvest.—Fruit should be harvested at the full-ripe stage before the berries begin to shrivel.

Handling.—Although not as perishable, black raspberries cannot be held for much longer periods than red or purple raspberries. Holding in a cool place after picking is desirable. Longer storage is possible at about 32° F. with 85 percent relative humidity, but the period should not exceed a few days.

Preparation.—Careful sorting and screening is desirable so that poorly formed, sunburned, or immature and small berries as well as stems and leaves may be eliminated. Washing may be desirable but is not always necessary. Drainage should be thorough.

Black raspberries are often reduced to seedless puree.

Packing.—Whole berries are not usually packed with sirup because they are too seedy for dessert use. If sucrose sirup is used, 40- to 50-percent concentration is satisfactory.

Dry frozen berries may be prepared for subsequent juice, jam, or jelly preparation.

Purees are prepared with sugar in a 3-to-1 fruit-sugar mix.

Uses for frozen product.—Dessert, flavor base, juice, jelly, or jam or Velva Fruit.

RASPBERRIES, RED, PURPLE, OR YELLOW

Desirable varietal characteristics.—Deep red or purple or bright orange-yellow color; absence of seediness; rich flavor, mild or sprightly acid; resistance to bruising, crumbling, or collapse.

Harvest.—Very careful attention to maturity is essential to high quality. Firm-ripe, bright-red raspberries are best; overripe fruit is usually too dark in color for use as whole fruit but may be used for seedless puree.

Picking should be frequent and thorough to avoid overripe or moldy berries. Raspberries picked after rainy or exceptionally warm weather may be inferior or moldy.

Handling.—Very rapid ripening of the raspberry demands the utmost speed and care in handling. Pick in the morning, preferably, and keep in the coolest place available. Storage for more than a few days at about 32° F. with 85-percent relative humidity is not desirable; any delay in packing and freezing should be very short.

Raspberries bruise and injure readily and must be handled with more care than other berries. Picking baskets and boxes should be shallow-filled and all jolting of the picked fruit avoided.

Preparation.—Sorting is desirable, but washing may not be necessary. If washed, raspberries should be thoroughly drained.

Seedless puree may be prepared by the method described on page 37.

Packing.—Whole berries may be packed with 40- to 50-percent sucrose sirup for dessert use, with sugar in various proportions (5 to 1, 4 to 1 or 3 to 1), or without sugar, in which case they may be frozen loose on trays before packaging.

Uses for frozen product.—Dessert, cobbler, pies, preserves, jam, and the purees for flavor base, sundae topping, or Velva Fruit.

SPINACH

Desirable varietal characteristics.—Deep-green color, minimum amount of woody or fibrous midrib, succulent leaves, and high flavor.

Harvesting.—Harvest before flowering begins or before the leaves become tough.

Handling.—Prompt processing is best. If this cannot be done, the spinach should be cooled to 35° or 40° F. by immersion in ice water. The spinach cooled in this manner should be drained and then kept covered with cracked ice during the holding period, or the cooled material may be held at 32° F. with 90 to 95 percent relative humidity.

STRAWBERRIES

Desirable varietal characteristics.—Bright-red color, lustrous skin, resistance to bruising, firm fine-grained flesh, red center, light-colored seeds, not too numerous, distinctively and sprightly acid flavor.

Harvest.—Full red color is essential to high quality and is a good indication of proper maturity. Fruit may be hulled at picking or just before packing; there is less danger of molding if it is done at the later time, although this may mean double handling of the berries.

Picking is preferably done in the early morning.

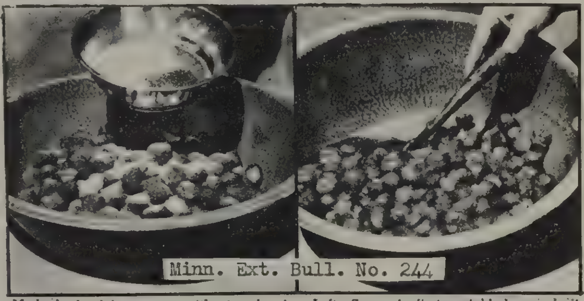
Handling.—Because of their rapid ripening and susceptibility to molding, prompt and careful handling of berries is very essential. Bruising is to be avoided, as with raspberries. In fact, the handling procedures for the two kinds of berry are quite similar.

Strawberries should be held in the coolest place available. During longer delays, storage at about 32° F. with 85 percent humidity is possible but not for more than a day or two.

Preparation.—Sorting, hulling if done just before packing, and thorough washing especially if fruit is dusty or muddy, are required. Draining after washing should also be thorough.

Berries may be sliced, especially for mixing with sugar in 5-to-1, 4-to-1, or 3-to-1 proportions.

Berries coarsely crushed with an ordinary wire potato masher or fork, with sugar (3 to 1) carefully mixed in without beating in air, makes a good ice-cream flavor base or sundae topping. Sliced berries with sugar (3 to 1) serve the same purpose. Puree packed with the same proportion of sugar and frozen rapidly produces a smooth-textured frozen dessert. Coarse crushed fruit, 2 parts to 1 of sugar, packed with an equal amount of whole fruit, makes excellent shortcake material.


Minn. Ext. Bull. No. 244

Method of mixing sugar with strawberries. Left—Sugar is first sprinkled over fruit. Right—After waiting a few minutes for the sugar to dissolve, the mixture is stirred carefully until each berry is coated with dissolved sugar and fruit juice

Packing.—Whole berries for dessert are preferably covered with a 40- to 50-percent sucrose sirup. They may also be packed with sugar (proportion 4 to 1 or 3 to 1), but color and flavor are not so well retained. For sugar pack, sliced or coarse-crushed strawberries are preferred.

Uses for frozen product.—Dessert, pies, cobbler, preserves, and jam. A mixture of coarse-crushed and whole berries is better for shortcake than whole fruit. Puree and pulp for sundae topping, flavor base, and Velva Fruit.

VEGETABLES, PUREED

The preparation of the vegetable for pureeing is essentially the same as for the whole or cut frozen product. After cooling, the vegetable is put through a food chopper and strained or freed from undesirable fibrous material.

After filling the containers, the pureed product should be frozen very promptly because the action of pureeing and the extra handling involved will tend to make the product more susceptible to microbial spoilage.

Another procedure suggested has been to cook the vegetables until soft and then to mash, cool them quickly, and freeze promptly after packaging. Tomato puree made of the cooked vegetable may be frozen alone or in combination with other pureed vegetables.

EQUIPMENT NEEDED TO PREPARE FRUITS AND VEGETABLES FOR FREEZING

1. Tables, a sink, and running water.
2. A set of household scales, if possible.
3. Suitable containers or packaging materials and a wide-mouthed funnel for filling packages.
4. Pans, stainless knives, cutting boards, measuring cups, large spoons, and ladles.
5. Paraffin, cold-storage tape, or other material for sealing containers; a flatiron or curling iron for heat sealing; tags or crayons for labeling; and a notebook for records.
6. For fruit: Colander or wire-screen sieve for washing fruit. Enamel, earthenware, or other noncorroding containers for washing and holding prepared fruit. Containers for mixing fruit with sugar or making sirup. Noncorroding screen sieve or special conical fruit sieve for pressing fruit into a smooth pulp or puree.
7. For vegetables: A good stove. Enamel or aluminum kettles with lids, for blanching; large kettles or a handy sink for cooling blanched vegetables; a fine-mesh wire or cheesecloth basket, with handles, for lowering the food into the blanching kettle and the cooling water; a screen or cloth drain for the cooled vegetables. A clock with a second hand to time the blanching period.

PLANTING TABLE — FIELD CROPS

Crop	Pounds per Standard Bushel	Rate of Seeding Pounds per Acre			Time of Seeding		Depth of Seeding	Time of Harvest
		Broadcast	Drilled	Rows	Fall	Spring		
Alfalfa	60	18-22	12-15		Aug-ea. Sept	Mar-Apr-May	Harrow, ½-1 in	June 10-July 20-Aug 30
Artichokes, Jerusalem	50		150-200			Mar-Apr-May	4	Sept-November
Bent Grass			25				½-1 in	When in full bloom
Barley, Spring	48		2 bu			Mar-April	½-1½ in	July
Barley, Winter	48		2 bu		Aug-Sept-Oct		½-1½ in	July
Beans, Navy, Field (Small)	60			25-30		May-June-July	1 in	July to September
Beans, Great Northern (Large, Navy)	60			40-60		May-June-July	1 in	July to September
Beet, Mangel Stock	30			6-8		April-May-June	1 in	September
Bermuda Grass	40		5-6		August	Mar-Apr-May	½-1 in	When in full bloom
Black Medic	60	18-20				Feb-Mar-Apr	½ in	
Blue Grass (for lawns)	14	125# or 1# per 200 sq.ft.			Aug-Sept	Mar-Apr-May	½-1 in	
Blue Grass, Kentucky	14		25		Aug-Sept	Mar-Apr-May	½-1 in	June
Blue Grass, Canadian	14		25		Aug-Sept	Mar-Apr-May	½-1 in	June
Blue Grass, Rough Stalked Meadow	14		20-25		Aug-Sept	Mar-Apr-May	½-1 in	June
Brome Grass	14		20		Aug-Sept	Mar-Apr-May	½-1 in	September
Broom Corn	48			5-8		Apr-May	1-2 in	August-September
Buckwheat	52		1 bu			June-July	1-2 in	September
Cane (See Sorghum)								
Carpet Grass	18		8-10			Jan-June	½ in	
Clover, Alsike	60		7-8			Feb-Mar-April	½-1 in	June-July
Clover, Alsike in mixture	60		2-4			Feb-Mar-April	½-1 in	June-July
Clover, Burr	12		30-40		Aug-Sept-Oct		½ in	
Clover, Crimson	60		15-20		July-Oct		½-1 in	April-May
Clover, Hop	60		10-12		Aug-Sept	Feb-Mar-April	½ in	June
Clover, Japan (See Lespedeza)								
Clover, Mammoth	60		8-10		Aug-Sept	Feb-Mar-April	½-1 in	June-July
Clover, Mammoth in mixture	60		4-6			Feb-Mar-April	½-1 in	June-July
Clover, Red	60		8-10		Aug-Sept	Feb-Mar-April	½-1 in	June
Clover, Red in mixture	60		4-6			Feb-Mar-April	½-1 in	June
Clover, Persian	60		6-8			Feb-March		
Clover, Sweet (See Sweet Clover)								
Clover, White (for lawns)	60	1# per 400 sq. ft.						
Clover, White	60		6-8		Aug-Sept	Mar-April-May	½-1 in	June
Clover, White Dutch	60		6-8		Aug-Sept	Mar-April-May	½-1 in	June
Corn	56			6-10		April-May-June	1-2 in	November
Corn, for Silage	56			40-56		April-May-June	1-½ in	September
Corn, Pop	56			3-5		Mav-June	1 in	November
Cottonseed, Fuzzy	32			32-50		Mar-Apr-May	1-1½ in	September-Oct-Nov
Cottonseed, Chemiclean	50			8-10		Mar-Apr-May	3/4-1 in	September-Oct-Nov
Crested Wheat Grass	22		12-20		Aug-Sept	Mar-Apr-May	½ in	June-July
Crotalaria	40		12-15			Apr-May-June	3/4 in	
Dalea (Woods Clover)			12-15			April	½-1 in	August-September
Dallas Grass	10		8-10			Mar-Apr-May	½ in	
Fescue, Chewing			15-20		Aug-Sept	Mar-June	½-3/4 in	June-July
Fescue, Meadow	24		25-30		Aug-Sept	April-May	½-3/4 in	June-July
Fescue, Red	14		15-20		Aug-Sept	March-June	½-3/4 in	June-July
Fescue, Sheep	14		28		Aug-Sept	April	½-3/4 in	June-July
Flax	56		30-40			April		July
Hemp	44		3 pecks			April-May	½-1 in	August
Johnson Grass	28		20-30		Aug-Sept	April-July	1 in	When in full bloom
Kaffir-Milo-Ferterita-Grohoma-Atlas Sorgo-Hegari	56	40-50	10-15			May-June	1-1½ in	September
Kale, Thousand Headed	50		4-5		Aug-Sept	Mar-Apr-May	½ in	
Lespedeza, Common (Japanese)	25	25-30				Mar-April	½-1 in	September
Lespedeza, Kobe	25	20-25	10-20			Mar-April	½-1 in	September
Lespedeza, Korean	25	20-25	10-20			Mar-April	½-1 in	September
Lespedeza, Sericea (Hulled)	60	25-30	15-30			Feb-Mar-April	½ in	When in full bloom
Millets, German for Hay	50		30			May-June-July	½-1 in	July-Aug-September
Millets, German for Seed	50		15			May-June-July	½-1 in	July-Aug-September
Millets, Hungarian for Hay	48		48			May-June-July	½-1 in	
Millets, Hungarian for Seed	48		30			May-June-July	½-1 in	
Millets, Japanese	35		20-30			May-June-July	½-1 in	
Mung Beans	60		8-10			May-June-July	½-1 in	
Oats	32	2-2½ bu	2 bu			Mar-April	1-1½ in	July
Oatgrass, tall			30		August	Mar-April	1-1½ in	When in full bloom
Orchard grass for hay	14		20-28		Aug-Sept	Mar-April-May	½-1 in	Before full bloom
Orchard grass for seed	14		10-14		Aug-Sept	Mar-April-May	½-1 in	
Peanuts	22		32-48			May-June	1½-2½ in	September
Peas, Australian Winter	60		30-35		Aug-Sept-Oct		2 in	
Peas, Canadian Field	60	2-2½ bu				Mar-April	1-2 in	
Peas, Canadian Field, with oats	60		75-90			Mar-April	1-2 in	
Peas, Cow	60	1½-2 bu	75-90	25		May-June	1-2 in	
Peas, Cow (in drill with corn)	60			20-30		May-June	1-2 in	
Rape	50	5-8	3-5			April-August	½-1½ in	October-November
Red Top, Solid Seed	14	6-8	6-8					Hay-when in full bloom Seed-July
Red Top, Unhulled	14	15-25	15-25		July-Aug-Sept	March-June	½ in	Hay-when in full bloom Seed-July
Reed Canary Grass	44		20-25		Aug-Sept	March-April	½-1 in	When in full bloom
Rice	45	3 bu	3 bu			April	1 in	September-October
Rye, Spring	56		60-90			Mar-Apr-May	½-2 in	July
Rye, Winter	56		60-75		Sept-Nov		½-2 in	July
Rye, Grass	24		25-35			Apr-May	½-3/4 in	When in full bloom
Sagrain	50		8-10			Apr-July	1 in	September
Sorghum, Grain	56	60	60	10-15		May-June	½-1½ in	September
Sorghum, Sweet	50		60-80	8-10		May-June	½-1 in	September
Sorghum, Forage	50		40-50	8-10		May-June	1-1½ in	September
Soybeans	60	75-120	75-120	50-70		May-June	1-2 in	September
Soybeans (with corn)	60			15-20		May-June	1-2 in	When in full Bloom
Sudan Grass	40	20-30	20	3-5		May-June-July	½-1 in	When in full bloom
Sugar Beets			18-20			April-May		
Sunflower	32		8-10	3-6		May	1-2 in	August-September
Sweet Clover, Bien., White	60		12-15		Aug-Sept	April-May	½-1½ in	August-October
Sweet Clover, Bien., Yellow	60		12-15		Aug-Sept	April-May	½-1½ in	August-October
Sweet Clover, Hulled	60		12-15			March	½-1½ in	August-October
Sweet Clover, Unhulled	30		30		Oct-Nov-Dec	Jan-Feb	½-1½ in	August-October
Tall Oat Grass	14		30-50		Aug-Sept	March-Apr-May	½ in	
Timothy	45		12-15		Aug-Sept-Oct	Mar-April	½-1 in	June-July
Velvet Beans	60		15-30			May-June	3-4 in	
Vetch, Winter or Hairy	60		40-60		June-Oct	Mar-April	1-2 in	July
Vetch, Spring	60		40-60			Mar-April	1-2 in	July
Wheat, Winter	60		75-90		Sept-Nov		1-3 in	July
Wheat, Spring	60		120			March	1-3 in	July
Wheat, Egyptian, Shallu	50		10-12			May-June-July	1½-2 in	
Yellow Trefoil			15		Aug-Sept		½ in	May-June

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

PLANTING TABLE — VEGETABLES

Crop	Seed per 100 ft. of row		Planting distance between rows. (inches)		Depth to plant in inches	Distance in row inches	Plant Seed		Transplant to field	Days required to mature from seed	Approx. yield per 100 ft. row
	Seed	Plants	Horse Cul.	Hand Cul.			in open field	in hotbed			
Asparagus roots	------	60–80	42–48	42–48	8–10	15–20	--------	------	March 15 April 15	3 years	50 lbs.
Beans, Bush	1 qt.	--- --	30–36	18–24	1–1½	4–6	April 15 June 15	------	----------	45–65	2 bu.
Beans, Bush Lima	1 qt.	----	30–36	18–30	1–2	4–6	May 20 June 10	------	----------	50–70	2 bu.
Beans, pole	¼ pt.	------	36–48	36	1–2	36–48	May 15 †June 15	------	----------	45–65	2½ bu.
Beans, Pole Lima	½ pt.	--- --	36–48	36	1–2	36–48	May 20 June 10	------	----------	65–80	2½ bu.
Beets	2 oz.	------	24–36	12–18	1	2–3	Apr. 1* June 15	Feb.15	---------	60–110	2½ bus.
Brussels Sprouts	¼ oz.	66	36	20–28	¼–½	18–24	--------	Feb.1 Feb.15	March 20 April 1	90–110	30 qt.
Cabbage, Early	¼ oz.	65–80	24–35	20–28	¼–½	15–18		Feb. 1 Feb.15	March 20 April 10	90–120	200 lbs.
Cabbage, Late	¼ oz.	50–65	36–42	24–32	½	24–30	June 1	------	July 10	100–135	250 lbs.
Cabbage, Chinese	⅓ oz.	80–100	24–28	18–24	½	12–15	July 1 July 15	Feb.1 Feb.15	March 20	80–100	85 heads
Carrots	½ oz.	------	24–28	12–18	½	2–3	Mar.15* May 1	------	----------	60–120	1½ bu.
Cauliflower	¼ oz.	65–80	36–42	24–30	½	18–24	--------	Feb. 1 Feb.15	March 20 April 1	100–120	60 heads
Celeriac	¼ oz.	200	36	24	⅛	6	--------	Feb.15	April 1	125	100 lbs.
Celery	¼ oz.	200	36–48	20–24	⅛	4–8	--------	Feb.15 Apr.1†	April 15 June 15†	120–150	200 stalks
Chard, Swiss	1 oz.	------	24–30	15–18	1	6–8	April 1	------	----------	50–120	50 lbs
Corn, Sweet	½ pt.	35–65	36–42	30–36	1–2	18–24	April 15* June 15	Apr.1‡	May 1	75–90	4 doz. ears
Cucumber	½ oz.	20–25	48–60	48–60	1	48–72	May 10 June 15	Apr.1†	May 10	90–130	200
Eggplant	¼ oz.	25–50	30–36	24	½	18–24	--------	Mar.1	May 20	150–160	125 fruits
Endive	½ oz.	75–100	24–28	14–18	½–1	8–12	April 10	------	----------	60–90	65 plants
Horseradish roots		70	30–36	24–30	3–4	14–20	--------	------	April 1	120–140	65–70 r'ts
Kale	¼ oz.	80–100	24–30	15–24	½–1	12–24	Apr. 1* Aug. 15†			90–100	60 bu.
Kohl-rabi	¼ oz.	120–150	24–28	15–24	½	4–8	--------	Feb 1 Feb 15	March 20 April 1	-------- 60–90	2 bu.
Leek	½ oz.	------	24–28	12–18	1	4–6	Mar. 20 April 1	------	----------	140–180	300 stalks
Lettuce	½ oz.	100–300	24–28	12–15	½	4–12	Mar.15* Aug. 1	Feb 15	March 20	60–95	25–50 lbs.
Muskmelon	½ oz.	20–25	48–60	48–60	1	60–72	May 10	Apr.1‡	May 15	90–120	90–110 melons
Mustard	¼ oz.	------	24–28	12–15	¼	2–3	Mar. 20* Sept. 1	------	----------	60–90	2½–3 bu.
Okra	1 oz.	40–50	30–36	30–36	1	18–24	May 1	------	----------	90–140	900–1000 pods
Onion Seed	1 oz.	------	24–28	12–15	½–1	2–3	April 1	Feb. 1	April 15	140–160	1½–2 bu.
Onion Set	2 qt.	------	24–28	12–15	1	2–3	--------	------	March 20	45–75	120 bunches
Onion, Bermuda	1 oz.	600	28–36	12–15	1	2–3	--------	Jan. 15	April 1 April 10	130–150	100 bunches
Parsley	¼ oz.	120–200	28–36	12–18	⅛	3–6	Apr. 15	------	----------	90–100	90 bunches
Parsnips	½ oz.	------	28–36	18–24	½–1	3–5	April 1 May 1	------	----------	140–160	2 bu.
Peas	1–2pt.	36–48	30–36	2	1–2	2–3	Mar. 15 Apr. 15	------	----------	75–100	2 bu. in pods
Pepper	¼ oz.	65–80	30–36	24–28	¼	15–20	--------	Mar. 1	May 15	140–160	2 bu.
Potato, Irish	5–8 lb	------	28–36	12–18	3–4	12–18	Mar. 20 June20†	------	----------	120–140	3 bu.
Potato, Sweet	------	65–75	36–48	36–48	3–4	14–18	--------	Apr. 1	May 10 June 10	140–150	3 bu.
Pumpkin	½ oz.	12–15	8–12	8–12	1	84–108	May 15	------	----------	90–120	75 pumpkin
Radish	1 oz.	------	24–36	12–18	½–1	1½–2	Mar. 15* Sept. 15	------	----------	30–65	100 bunches
Rhubarb Plants	------	33	36–60	36–60	2–3	36–60	--------	------	April 1	365	250–300 stalks
Salsify	1 oz.	------	30–36	18–24	½–1	2–4	April 1 May 1	------	----------	140–160	600 roots
Spinach	1 oz.	------	30–36	12–18	1	2–4	Mar. 15* Sept 10†	------	----------	60–80	3 bu.
Spinach, N. Zealand	1 oz.	------	30–36	30–36	1	12–18	Apr. 15 June 15	------	----------	60–150	75–100 lbs
Squash, Summer	½ oz.	20–40	36–48	36–48	1	36–48	May 10	April 1	May 15	60–65	125 squash
Squash, Winter	½ oz.	15–35	84–108	84–108	1	84	June 1	------	----------	125–140	75 squash
Tomatoes	¼ oz.	25–35	36–60	36–48	¼	36–48	--------	Mar.10	May 10 June 1	150–170	4 bu.
Turnips	½ oz.	------	24–36	18–24	¼–½	------	March 20 Aug. 1†	------	----------	60–80	2 bu.
Watermelon	1 oz.	30	96–144	96–144	1	84–108	May 10 June 10	Apr.1‡	May 15	100–130	40 melons

The dates in this table are approximate and for Central Missouri conditions.
*Make succession plantings every 4 weeks.
†Planting date for fall crop
‡Started in paper bands or pots in hotbed.

Earlier seeding is possible South of Missouri, and later seeding is necessary North of Missouri.

Missouri Agricultural Extension Service Circular 167

HOME GARDENS

HOW MUCH TO PLANT, STORE AND PRESERVE

FOOD	SUGGESTED SERVINGS PER PERSON		AMOUNTS TO PRESERVE OR STORE			AMOUNTS TO PLANT[b] PER PERSON		AMOUNTS TO PLANT FOR MY FAMILY	
	Weekly	Yearly	Per person	Total for my family	Preferred method[a]	In spring garden	In fall garden	In spring garden	In fall garden
VEGETABLES									
GROUP 1									
Tomatoes	6	310	30 qt.	....	Canning	14 plt.		....	
GROUP 2									
Cabbage	6	180	40 lb.	....	Pit storage Kraut	4 plt.	32 plt.	....	....
Lettuce		35				6 ft.	6 ft.	....	....
Spinach		40	6 pt.	....	Freezing	28 ft.	28 ft.	....	....
Chard or mustard		55 (310)				13 ft. chard		....	
						or			
						35 ft. mustard	35 ft. mustard	....	....
GROUP 3									
Beans, string	3	75	8 qt.	....	Canning	18 ft.	18 ft.	....	....
Peas		40	5 pt.	....	Freezing	128 ft.		....	
Asparagus		20	3 pt.	....	Freezing	10 ft.		....	
Broccoli		15 (150)			(Freezing)		8 plt.		....
GROUP 4									
Carrots	3	85	12 lb.	....	Pit storage	4 ft.	16 ft.	....	....
Potatoes, sweet		50	1 peck	....	Dry storage	44 ft.		....	
Squash, winter		15 (150)	5 lb.	....	Dry storage	1 hill		....	
GROUP 5									
Onions	2	30	5 lb.	....	Dry storage	19 ft.		....	
Corn		30	5 pt.	....	Canning Freezing	16 hills		....	
Turnips, white		20	5 lb.	....	Pit storage	3 ft.	10 ft.	....	....
Beets		15	2 lb.	....	Pit storage	8 ft.	6 ft.	....	....
Parsnips		5 (100)	2 lb.	....	Pit storage	3 ft.		....	
GROUP 6									
Potatoes, white	7 to 14	365 to 730	½ to 1 bu.[c]	....	Cellar	45 to 90 ft.[c]	45 to 90 ft.[c]	....	....
FRUITS									
Apples	8 to 14	360	1½ bu.	....	Cellar Canning	Tree and small-fruit crops do not come into production for 1 to 10 years after planting. Those interested in starting a small home orchard will find information in Circular 524, "Growing Fruit for Home Use;" those interested in strawberries and the bramble fruits (raspberries, blackberries, and dewberries) will want Circular 453, "Strawberry Culture in Illinois," and Circular 508, "Bramble Fruits." These publications will be sent free upon request.			
Peaches		130	16 qt.	....	Freezing Canning				
Berries		60	6 qt.	....	Freezing Canning				
Pears		50	8 qt.	....	Canning				
Cherries		30	4 qt.	....	Freezing Canning				
Plums		30	5 qt.	....	Canning				
Rhubarb		50	4 qt.	....	Canning	9 plt.		....	
Cantaloupe		20 (420 to 730)				3 to 4 hills		....	

(a) Other methods of preserving can also be used. **Spinach, carrots, beets, and asparagus** may be canned; **peas,** canned or dried; **corn,** dried or salted; **string beans,** salted or frozen. A portion of the **tomatoes** may be made into catsup and chili sauce. Small amounts of the **fruits** can be used for jelly, marmalade, conserve, jam, butter, and spicing. (b) These amounts are based on average state yields; figures supplied by Department of Horticulture. (c) These amounts of **potatoes** will be enough for only half the suggested number of servings. It is impractical to raise potatoes in the home garden for the year-round supply; they will not keep in storage much beyond 90 days.

University of Illinois

FOOD REQUIREMENTS

THE AMOUNT THAT SHOULD REACH THE KITCHEN

FOODS	DAILY OR WEEKLY AMOUNTS PER PERSON (approximate)		LIBERAL AMOUNTS PER PERSON PER YEAR				AMOUNTS FOR MY FAMILY FOR A YEAR
			Moderately active man or boy over 14	Moderately active woman or girl over 12	Child 8 years	Child 3 years	
DAIRY PRODUCTS	*Adult*	*Child*					
Milk	1½ to 2 pt. daily	1 qt. daily	*gal.* 65 to 90	*gal.* 65 to 90	*gal.* 90	*gal.* 90	........................gal.
Cream and cheese	(Part of the above milk may be used in these forms)						
Butter (see also Lard, etc.)	1-1¼ lb. weekly	⅛-½ lb. weekly	*lb.* 52 to 65	*lb.* 52	*lb.* 26	*lb.* 7	........................lb.
VEGETABLES and FRUITS							
Potatoes and sweet potatoes	1 to 2 servings daily		*lb.* 180	*lb.* 150	*lb.* 100	*lb.* 65	........................lb.
Tomatoes (fresh or canned) and citrus fruits	1 serving daily		180	180	160	100	........................lb.
Dried beans and peas	2 to 3 servings weekly		20	15	8	0	........................lb.
Leafy, green, yellow vegetables	1 to 2 servings daily		200	200	160	100	........................lb.
Other vegetables and fruits	2 or more servings daily		230	170	160	80	........................lb.
EGGS	1 daily		*doz.* 30	*doz.* 30	*doz.* 30	*doz.* 30	........................doz.
MEAT and MEAT PRODUCTS							
Beef, veal, lamb, pork, poultry, and fish	1 or more servings daily		*lb.* 160	*lb.* 130	*lb.* 80	*lb.* 20	........................lb.
Lard, bacon, and fat back	Moderate amounts; may replace part of butter		...	...	...	...	........................lb.
CEREAL PRODUCTS							
Flour: whole grain or enriched	As bread, biscuits, etc., every meal		*lb.* 180 to 220	*lb.* 150	*lb.* 100	*lb.* 50	........................lb.
Cereal: whole grain or enriched	For breakfast daily; frequent use in combination dishes						
SWEETS	*Adult*	*Child*					
Sugars: white, brown, or maple Sirups: sorghum, corn, molasses, etc. Jams, jellies, preserves	Moderate amounts	Small amounts	*lb.* 70	*lb.* 45	*lb.* 25	*lb.* 6	........................lb.
MISCELLANEOUS	Beverages, condiments, baking powder, etc. Since these items will be used in variable quantity and must be purchased, no estimate is given.						

University of Illinois

CITRUS INDUSTRY FACES SURPLUSES

The rapid increase in the investment in citrus lands, groves, and processing plants makes it appropriate to summarize some of the facts showing the present status of the industry. Those who do not have an investment in the business may want to pass this data on to someone who is directly interested. All are affected as consumers.

CITRUS PRODUCTION

The increase in citrus fruit production in recent years has been the most spectacular of that of any of the important agricultural crops of the United States.

Orange and tangerine production in 25 years has increased over 4 times.

Grapefruit production in the same 25-year period has increased over 9 times.

Limes in 10 years have shown the following increases:

1934-35 - 15,000 Boxes
1943-44 - 190,000 Boxes

Lemons have shown no major increase.

The increase is continuing at a very rapid rate. Note the following U.S. totals for all citrus fruit:

1941-43 - 137,288,000 Boxes
1942-43 - 154,912,000 Boxes
1943-44 - 169,246,000 Boxes

The increase is most rapid in Florida. It is freely predicted that citrus production for Florida alone will reach 100,000,000 boxes within five years. Within ten years, the total may easily exceed 125,000,000 boxes.

"For the first time, or since Texas became a major producing area, Florida's production of oranges, grapefruit, and tangerines exceeded that of all other citrus producing states combined, with over an eighty million box crop. --Florida produced approximately 50 per cent more than California and four times that of Texas."

While the war has been in progress, the impact of this great production increase has not been disturbing. There is, however, reason to fear the consequences as soon as the war demand declines.

"Citrus production is no longer a self-contained farm operation. The moment the crop reaches maturity, it reverts from an agricultural status to one of industrial. The fruit is harvested by non-farm labor; hauled to a central packing plant; prepared, shipped and marketed on a mass basis; and its handling regulated by governmental agencies. Of the gross money return from the crop, one-third (broadly speaking) goes for the purely agricultural function of producing the fruit while the other two-thirds is divided among the several industrial and promotional phases through which the crop passes from grove to consumer."

CITRUS UTILIZATION

The trend of the form in which citrus is used is important.

Oranges have shown a consistent increase in fresh sales.

Even though fresh sales have increased, the rate of increase of processed fruit has been much more rapid. Orange juice canning is still small in amount, but with blends that are proving popular, the rate of increase should quicken.

Orange juice as now canned by the best processors is a very satisfactory product.

Grapefruit has not shown an increase in fresh use for the past seven years.

Canned grapefruit juice has much the same taste as fresh juice and has satisfactory consumer acceptance.

Processing, primarily juice canning, has increased very rapidly. For the 1943-44 season, 64 per cent or almost two-thirds of the crop was canned for Florida. This same relationship holds for the 1943-44 season just closed.

The citrus industry has rapidly shifted toward a processing base. Processing appears to be the primary hope for continued use of the large citrus production which lies ahead.

The present marketing and utilization of citrus is developing along the following lines.

Fresh-fruit use is leveling off as is shown especially by grapefruit. When the war demand subsides and people become more educated to juices, it is possible that even declines may take place in the sale of some fresh citrus fruits. New film wrapping of each fruit at a cost of about 10 cents per box will greatly extend the keeping period for fresh fruit.

Canned fruit juices are supplying an increasing amount of the trade. Blends, especially of orange and grapefruit juice, have rapidly increased in demand. Any temperature below 80 degrees will preserve the quality.

Concentrated fruit juices as now canned are going almost entirely for war use. Such as has been released has found ready sale to civilian trade, especially for hotels, restaurants and soft-drink manufacturers. It must be kept at 50 degrees or less temperature.

Concentrate produced by freezing and separating as developed by the Florida Agricultural College appears to hold important future possibilities. It will require lower temperatures.

Powdered juices are being experimented with and some research workers expect it to have commercial use.

Canning of segments, especially grapefruit, gives a product much in demand.

Canning of mixed segments--especially grapefruit and oranges and other fruit-salad mixtures--gives a popular product.

CITRUS INDUSTRY FACES SURPLUSES

By-products of canning factories include:

Feed in the form of pulp. It competes with dried beet pulp and gives satisfactory use.
Molasses is extracted from water squeezed out of the pulp. It is usually used to enrich the feed.
Alcohol can be produced and at least one plant apparently has been developed.
Oils of various kinds are extracted.
Acids are being produced.
Yeasts are commercially made from citrus.

This is not a complete list but shows that in a modern processing plant there is no waste disposal as all of the fruit goes into some salable form. Research will develop further products.

It is the opinion of most people that by the addition of juices and various canned products to fresh fruit, there is not much total added demand due to the form of the product. Juices largely replace fresh fruit on the market. Concentrates will primarily replace fresh, canned fruit and single-strength juices. If this is correct, it sets a much lower limit on total use than would otherwise be the case.

FRUIT CONSUMPTION

A study of figures on fruit consumption per capita reveals such facts as the following. Note these data do not include the most abnormal recent war years.

Total fresh fruit consumption in the 32 years--1909 to 1940--showed a slight upward trend from 137 pounds to 154, a gain of 17 pounds. Fresh fruits have averaged about 76 per cent of the total supply.

Apple consumption has declined about 25 pounds per person.

Citrus fruit consumption increased 41 pounds per capita.

Bananas, peaches, grapes and pears have not shown any marked trend in either direction. Banana consumption has remained near 22 pounds per person.

Canned fruit consumption increased about 5 times during the 32 years. From 1936 to 1940, the average per capita consumption was over 15 pounds.

Dried fruit consumption increased about 50 per cent per capita during the 32 years to 5.6 pounds.

Canned fruit juice consumption has increased rapidly since 1930 to 8.7 pounds per person in 1940.

Frozen fruits have just started to come into prominence. By 1940 the apparent consumption was only 1.2 pounds per person.

CITRUS CONSUMPTION POSSIBILITIES

For a minimum nutritional requirement a person should have about one-third pint of orange juice or its equivalent per day. Preferably, this amount should be increased.

The citrus production of 1943-44 was a little over 1.2 boxes per person. This is a minimum requirement for about 162 days or less than one-half year.

But citrus fruit is only a little over one-third of all fresh fruits and canned juices, segments, etc., and appears to be less than one-half of the total canned fruits and juices.

If the foregoing rapid analysis is correct, it appears that present production of fruits is enough for minimum requirements.

Since many people will never get even their minimum requirements of fruit and juices, it means that present production is fully supplying the nutritional requirement of most of those who can afford fruits and who have been educated to the point of regularly buying fruit or fruit juices.

EFFECT OF POPULATION TRENDS

The upward trend in population is due to slow down and enter a decline within the next 25 years, according to authorities. This would be 5 to 10 years before citrus groves planted now would reach their maximum production.

Major increases in U.S. citrus fruit consumption will, therefore, need to come from increases in per capita consumption instead of from increased population.

SOME CONCLUSIONS

Economists interviewed could see nothing but severe trouble ahead. As they expressed the outlook, "those making plantings now are running real risks."

The primary hope for the industry expressed by all lies in canning of juices and segments, concentrates, and in complete utilization of by-products.

There is general agreement that only the most highly efficient will survive the low price years ahead.

Only the large companies prepared to do low-cost canning, concentrating and selling will make profits in the opinions of most. The small grower will be at the mercy of the owners of the big plants and factories. The trend of the past toward consolidating groves will continue. The big operators will buy up, at low prices, the small groves as the owners become disgusted and quit.

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DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

CITRUS FACTS

LOCATION OF PRODUCING AREAS

Climate pretty well determines location of the citrus areas. Hard freezes lasting for any appreciable length of time are fatal to both crop and trees. The disastrous effects of cold weather on citrus are best illustrated by the severe freezes in Texas where grapefruit production dropped from an average of 16 million boxes from 1941-50 to 200,000 boxes in 1951 after a bad winter.

NUMBER OF ALL TREES IN PRODUCING STATES, 1950

CALIFORNIA

Oranges	*20,561,934*
Grapefruit	*884,861*
Lemons	*5,903,700*
Limes	*31,554*

TEXAS

Oranges	*4,956,114*
Grapefruit	*5,244,944*
Lemons	*36,872*
Limes	*1,200*

FLORIDA

Oranges	*18,916,905*
Grapefruit	*6,045,732*
Tangerines	*1,145,067*
Limes	*355,261*

LOUISIANA

Oranges	*426,088*
Grapefruit	*1,826*
Lemons	*1,059*

ARIZONA

Oranges	*684,222*
Grapefruit	*713,472*
Lemons	*75,242*
Limes	*2,274*

MISSISSIPPI

ALABAMA *GEORGIA*

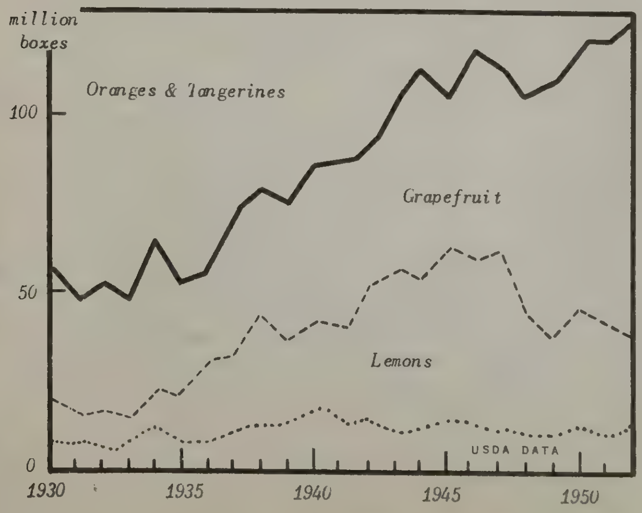
Oranges	*42.867*

Most of the fruit grown in Mississippi, Alabama, and Georgia is for ornamental use rather than commercial production. Some is moved locally but most of the commercial production comes from the five states of Florida, Texas, Louisiana, Arizona and California.

TRENDS IN PRODUCTION

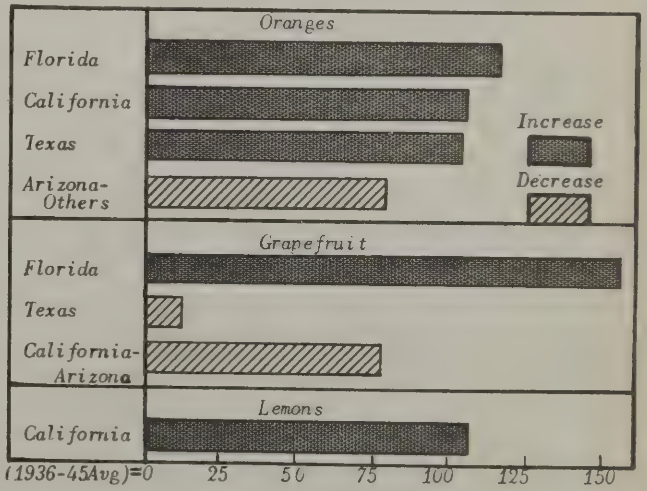
Output of citrus has been climbing ever since records have been kept. Biggest increase has come in oranges as new methods of marketing have continued to expand markets. Grapefruit has been set back in recent years by severe frost damage. But underlying uptrend is likely to expand output in the future. Lemon production growth has been steady but not sensational. Lime output not shown in graph, has increased 37 times in the past two decades.

TRENDS IN CITRUS PRODUCTION



1952 EST. SEASON BEGINS WITH BLOOM OF YEAR SHOWN AND ENDS WITH COMPLETION OF HARVEST THE FOLLOWING SEASON.

CITRUS PRODUCTION, BY STATES, 1951
As A Percentage Of The 1936-45 Average



Oranges. Growth in orange production in the past decade has mainly been in Florida. Reasons hinge on the lower cost, since irrigation isn't required, and the pressure on California groves for use as real estate. High cost production and the availability of more profitable enterprises have contributed to the decline in Arizona's output. The bad 1951 freeze set Texas far behind other producing areas.

Grapefruit. Here again, Florida is leading in growth much for the same reasons as for oranges. Texas has an established market for

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CITRUS FACTS

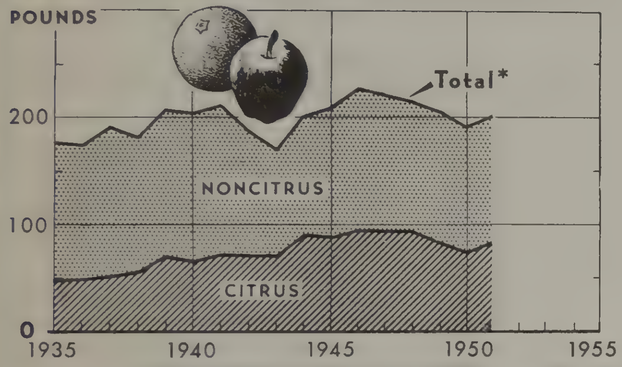
their pink fruit, but the freeze cut production down so much, that Florida and Arizona output is cutting into this market.

Lemons. Almost 100 per cent of the lemon output comes from California. A steady growth, more or less proportional to population increases, is indicated here.

CITRUS CONSUMPTION

Growth of citrus production has come because of the increasing consumer demand for this kind of fruit.

FRUIT CONSUMPTION PER PERSON



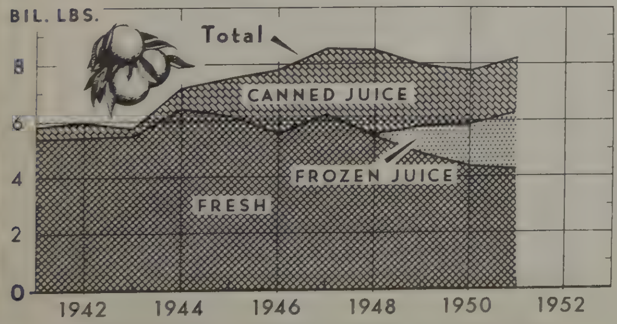
*CIVILIAN CONSUMPTION PER PERSON, FRESH EQUIVALENT BASIS

USDA-BAE

Fresh Fruit -- The U.S. consumption climbed from near 40 pounds per capita in the 1930's to a peak of just under 70 pounds in 1944. Since that time per capita use of fresh citrus has been on the decline.

Canned Juice has more than taken up the slack. Single strength, or hot pack, consumption climbed steadily until the introduction of frozen concentrate in 1948. Consumer use of the frozen product has surged upward. Canned and frozen juice will probably use up more of the citrus crop than fresh fruit this year.

ORANGE CONSUMPTION BY CIVILIANS



YEAR ENDING NOVEMBER 1; FRESH WEIGHT EQUIVALENT BASIS; EXCLUDES MINOR QUANTITIES OF CANNED ORANGE SEGMENTS

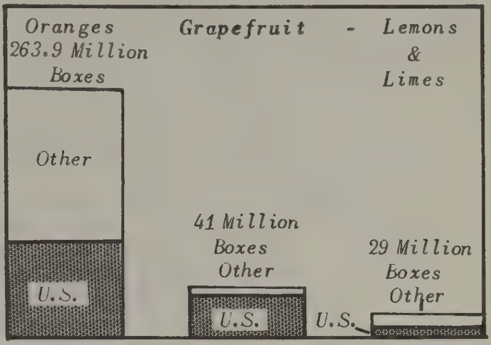
USDA-BAE

New markets for citrus are being developed. Frozen orange juice, vending machines, concentrate frozen-on-stick are a few examples.

WORLD OUTPUT

Citrus production in the Old World can be traced back a long time -- well before the birth of Christ. It was unknown in the New World before Columbus discovered America. Yet, at present, the United States leads all other countries in citrus output.

WORLD CITRUS



USDA DATA

RETURNS FROM CITRUS PRODUCTION

The strong uptrend in citrus plantings -- 1.5 million new trees in 1950-51 in Florida compared to .8 million in 1940-41 -- indicates that citrus profits are still attracting new capital.

Records kept by Florida Experiment Station Economist, Zach Savage, give a good picture of the costs and returns trend on citrus in the state.

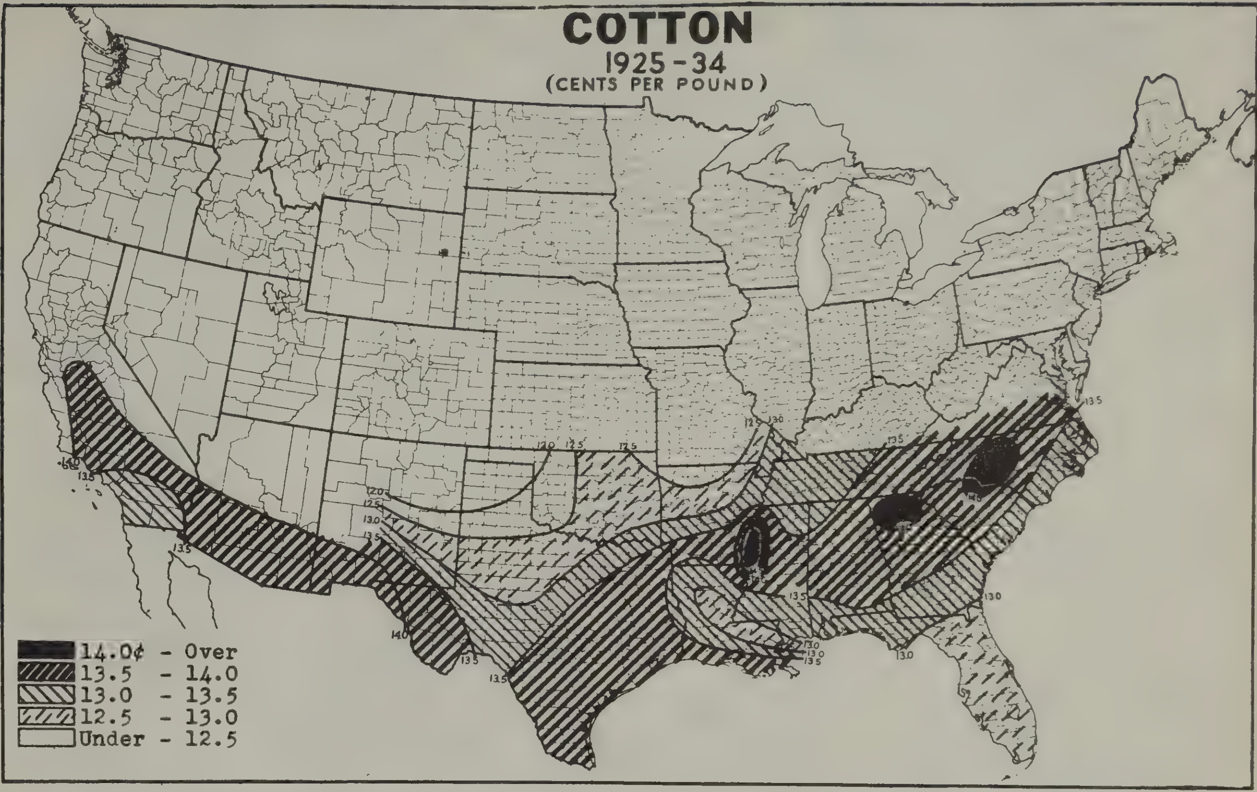
COSTS AND RETURNS FOR FLORIDA GROVES
Over 10 Years Old, 5 Year Averages, 1931-1951.

	1931-36	1936-41	1941-46	1946-51
Acres per grove	32	35	35	36
Trees per acre	59	60	62	62
% Trees Grapefruit	31.8	31.1	31.6	30.7
Boxes per acre	126	175	250	314
Costs per Acre				
Operating	$57.24	$58.10	$98.20	$148.39
Total	95.15	88.63	128.75	190.70
Returns per Acre				
From fruit	$93.45	$102.02	$420.70	$328.95
Net returns	-1.70	13.39	291.95	138.25
Returns above operating costs	36.21	43.92	322.50	180.56

Labor, power and equipment make up about 45 per cent of grove costs. Fertilizer materials account for 37 per cent which might be lower in more fertile areas. These figures bear out estimates by many that a good citrus grove will pay as high a return on money as any investment. These figures are probably lower than similar cost data for other producing areas.

In California, Texas, and Arizona, costs of irrigation would have to be added in. Florida may also have some marketing advantage since it is the closest producing area to the big consumption centers of the East Coast.

PRICE ZONES — AVERAGE PRICES RECEIVED BY FARMERS



Average prices received by farmers for cotton, by crop reporting districts, 1925-1934

(Cents per pound)

State	1	1N	1S	2	2A	3	4	5	5A	6	7	8	9	10
Missouri........	•	-	-	•	-	•	•	•	-	•	•	12.3	13.5	-
Virginia........	-	-	-	•	-	-	•	•	-	•	•	•	13.7	-
North Carolina..	13.7	-	-	14.1	-	13.5	13.8	14.0	-	13.8	-	14.2	13.9	-
South Carolina..	13.9	-	-	14.2	-	13.8	13.9	13.9	-	-	-	13.5	-	-
Georgia.........	14.0	-	-	14.1	-	13.9	13.9	13.6	-	13.6	13.5	13.3	13.4	-
Florida.........	13.4	-	-	-	-	12.8	-	12.7	-	-	-	•	-	-
Tennessee.......	13.3	-	-	13.2	-	13.2	13.4	13.8	-	13.6	-	-	-	-
Alabama.........	13.4	-	-	13.5	13.6	13.8	13.4	13.5	-	13.8	13.9	13.5	13.5	-
Mississippi.....	14.3	-	-	13.6	-	13.3	14.4	13.6	-	13.5	13.6	13.4	13.4	-
Arkansas........	12.8	-	-	12.6	-	13.0	13.1	13.6	-	13.3	13.8	13.6	13.6	-
Louisiana.......	13.3	-	-	13.1	-	13.5	13.4	13.2	-	13.0	13.6	13.8	13.9	-
Oklahoma........	12.1	-	-	13.0	-	13.1	12.6	13.1	-	13.1	12.4	13.2	13.5	-
Texas...........	-	12.6	13.0	13.1	-	13.2	13.7	13.6	-	13.7	13.6	13.8	13.9	13.7
New Mexico......	•	-	-	-	-	11.6	-	-	-	-	•	-	14.6	-
Arizona.........	-	-	-	•	-	-	-	15.7	-	-	14.6	-	14.0	-
California......	•	-		•	-	•	•	•	14.9	•	-	13.5	-	-

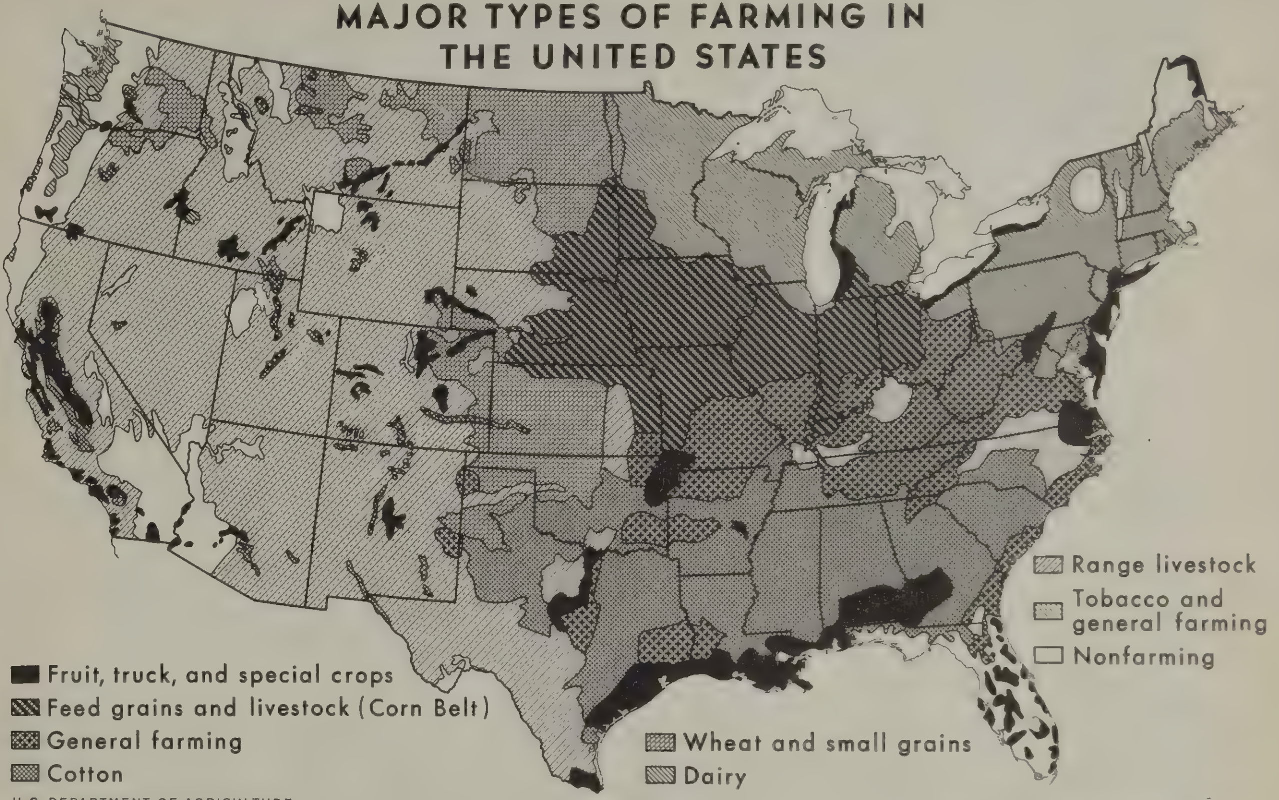
• Data not available.

Compared with the prices of grain crops, those of cotton show relatively little regional variation. This results primarily from the relatively high value per pound of cotton. Differences in quality and staple length are more important factors than transportation costs in determining regional variations in prices of cotton. Lowest prices were received by farmers in the Texas Panhandle and northwestern Oklahoma, resulting from the combination of lower quality and long distance from markets. Highest prices were received in the Delta regions of Mississippi and Arkansas, where high-quality, long-staple cotton is produced. Prices were also relatively high in localized areas of North Carolina, South Carolina, and Georgia where fairly high-quality cotton is grown and local mill requirements absorb a sizeable portion of the crop.

U S DEPARTMENT OF AGRICULTURE

TYPES OF FARMING

American agriculture produces a wide variety of crops and livestock. Through years of experience, farmers in a given area have learned they can raise certain crops and livestock more profitably than others. Economists call this the "law of comparative advantage".


MAJOR TYPES OF FARMING IN THE UNITED STATES
▨ Fruit, truck, and special crops
▨ Feed grains and livestock (Corn Belt)
▨ General farming
▨ Cotton
▨ Wheat and small grains
▨ Dairy
▨ Range livestock
▨ Tobacco and general farming
☐ Nonfarming

U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF AGRICULTURAL ECONOMICS

Types of farming areas have resulted from:

- Climate, including annual and summer rainfall, length of growing season and temperatures. Crops vary widely in their moisture and temperature requirements. (See pages 711 and 721.)

Most of the United States west of the longitude 103°, (sometimes called the 20 inch rainfall line) which runs through the Western Dakotas and Nebraska, Eastern Colorado and Western Texas, is a dry and semi-arid region. Altitude and rainfall largely determine whether this land will be used for grazing or crops.

- Soils and topography -- Level soils, naturally high in fertility and organic matter, are suited for intensive grain production. Others that are rolling and low in fertility, should be used for grazing or timber.

- Markets -- The demand for a product will influence the type of farming. Dairy and truck farming areas develop near cities where a large market is assured.

- Transportation -- Perishable products must be produced where they can be marketed quickly. Bulky products must be produced near the market to avoid high shipping costs. Good transportation makes possible the specialized production of vegetables and truck crops in Southern and Western states during the winter months.

The Dairy Belt -- This area, extending, from Minnesota east to the Atlantic coast, is an area of adequate rainfall throughout the growing season. Pastures are excellent and good hay crops can be grown, but the hilly and rolling topography, along with a short cool growing season, makes it hard to mature a good corn crop. Large industrial cities nearby make a good market for dairy products. The twelve states in this region comprising 12 per cent of the farm land in the country had 38 per cent of the milk cows on June 1, 1950.

TYPES OF FARMING

The Corn Belt, covering parts of 10 states, extends from Central Nebraska eastward to Central Ohio. Here a growing season of 150 to 180 days along with warm summer temperatures and ample rainfall make the ideal conditions for corn production.

Although corn is grown in every state, other areas do not have as favorable conditions. Farther north the growing season is too short, to the West it is too dry, and in the South, cotton growing is more profitable.

The six Corn Belt states of Iowa, Illinois, Minnesota, Indiana, Nebraska and Ohio produced 60 per cent of the Nation's corn crop from 1939-48. In the same years, these states also produced 50 per cent of the total oats crop and 85 per cent of the soybean crop.

Livestock production is a major enterprise on Corn Belt farms. The North Central states raised 75 per cent of the pigs from 1939-48. Steers and calves on Corn Belt farms January 1, 1950 comprised over 50 per cent of total number on all farms.

The Cotton Belt extends from the Atlantic coast westward to northwestern Texas. The northern limit is the 200 day frost-free growing season line running through central North Carolina, Tennessee, southern Missouri, and northern Oklahoma. The southern limit is the subtropical gulf region.

The eleven leading cotton states which produced 94 per cent of the total crop from 1939-48 were: Texas, Mississippi, Arkansas, Alabama, Georgia, South Carolina, North Carolina, Tennessee, Louisiana, Oklahoma, and California.

During recent years the center of production has moved westward. From 1939 to 48, Texas, New Mexico, Arizona, and California produced 31 per cent of the total crop. In 1949, these states produced 50 per cent of the crop. In 1950, despite severe acreage restrictions, they produced 43 per cent. The non-restricted production planned for 1951 will probably see increased production in these new producing areas.

Peanuts, tobacco, rice, soybeans, cattle, and hogs are also produced in the Cotton Belt. Ninety per cent of the average 1.9 billion pound crop of peanuts from 1939 through 1949 were produced in Georgia, North Carolina, Alabama, Texas, and Virginia.

Considerable progress in livestock production is being made in this area. Interest in year-round pastures is growing by leaps and bounds. Cattle numbers have increased 18.5 per cent in the South Atlantic and South Central states since 1940. Cattle increase for the country as a whole was only 13 per cent.

General Farming -- Between the Corn Belt to the north and Cotton Belt to the south lies an area of mixed types of farming. This area extends from Virginia westward through Missouri. Many farms in this region are largely self-sufficing. Others have specialized in tobacco, orchards, grain, and livestock.

North Carolina, Kentucky, Virginia, Tennessee, and South Carolina produced 82 per cent of the tobacco crop which averaged 1,777 million pounds from 1939-48.

Wheat And Small Grain Belt -- Extending north from Texas to the Dakotas, and in parts of Montana, Washington and Oregon, is the area where wheat and small grains are the main crops. Rainfall from 15-25 inches per year and a short growing season in the north make this area unsuitable for corn production.

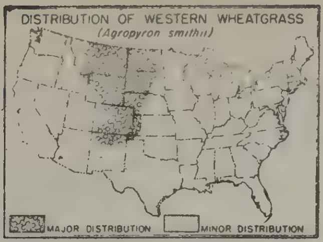
The seven leading wheat states from 1939-48, producing 62 per cent of the total crop, were Kansas, North Dakota, Oklahoma, Montana, Nebraska, Washington, and Texas. Flax is grown in Minnesota, North and South Dakota. Seventy-five per cent of the average 34 million bushel crop was produced in these 3 states during the ten-year period. Texas, Kansas, and Oklahoma produced 85 per cent of the average 108 million bushel grain sorghum crop during the 1939-48 period.

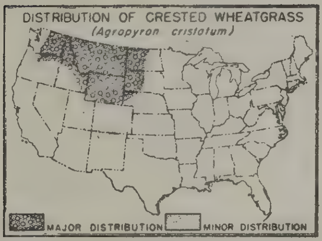
Range Livestock -- This area has been determined by the rough mountainous topography and low rainfall which makes its value limited to range pasture and hay production. In many areas, the soil is high in fertility but rainfall is a limiting factor. Irrigation is making some of this land highly productive.

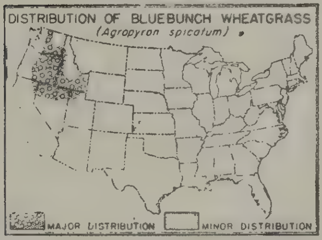
Fruit, Vegetables, And Special Crops -- Fruit production is a very specialized type of farming. A semi-tropical climate makes Florida, California, and Texas the leading citrus producing states. In the ten-year period 1939-48, California produced 50 per cent and Florida 44 per cent of the total orange crop. Florida produced 52 per cent and Texas 36 per cent of the grapefruit during the same period.

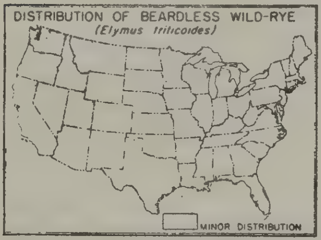
The even temperatures produced by breezes blowing across large bodies of water make the Great Lakes and ocean shorelines large fruit producing areas. Other fruit producing areas have developed because of suitable soils, available labor, and nearby markets.

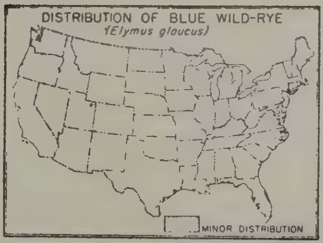
Although types of farming are largely determined by natural and economic factors, the final choice still rests with the individual farmer. For this reason a wide range of farming operations are carried on in each type-of-farming area. Through the years types of farming has changed or shifted to different areas. Under government programs, types of farming tend to be kept the same in each area.

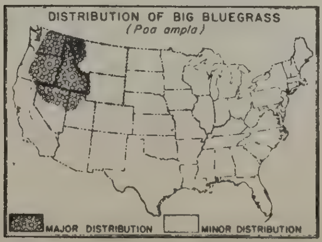












WHEATGRASS

Four of the wheatgrasses, all adapted to cold climates, find their greatest usefulness in the northern Great Plains, the intermountain region, and the higher elevations of the Rocky Mountain States. The fact that these grasses bind the soil, make good forage and ground cover, and are adapted to a wide range of soil and climatic conditions places them in the front rank of grasses useful in soil conservation.

Western wheatgrass (*Agropyron smithii*), a native perennial, is for both pasture and forage. Western wheatgrass has several outstanding characteristics that make it exceedingly valuable for use in erosion control. Its rapid growth and strongly creeping rootstocks quickly produce both a ground cover and a heavy sod.

Crested wheatgrass (*Agropyron cristatum*) was introduced from northern regions of the Union of Soviet Socialist Republics. It is a very good pasture and forage grass, is resistant to extreme drought and cold has a deep, extensive root system, and reseeds readily. It is, therefore, especially suitable for seeding in the dry, wind-erosion areas.

Bluebunch wheatgrass (*Agropyron spicatum*), a native bunch grass, is very palatable and reproduces only from seed, deferred grazing, which permits the old plants to produce their seed crop before livestock trample them into the soil, is recommended.

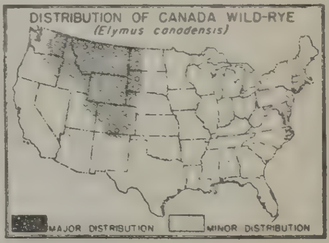
Beardless bluebunch wheatgrass (*Agropyron inerme*) has the same distribution as bluebunch wheatgrass (*A. spicatum*) but differs from it in that it has no awns.

WILD-RYE

Medium palatability is characteristic of this group of grasses, but their excellent seed habits, heavy foliage, and relative ease of establishment place them among the most valuable grasses for use in revegetation.

Beardless wild-rye (*Elymus triticoides*) is a heavy, sod-forming grass resembling western wheatgrass, with which it has frequently been confused. It is well adapted to the alkali and prairie soils and climate of the Pacific Northwest. Its extensive creeping rootstocks and colonizing habit of growth, its heavy foliage, and ability to produce good seed make it an excellent grass for erosion control. The plants tend to become coarse and woody when mature. Although this reduces their palatability, it greatly increases their usefulness as a ground cover.

Canada wild-rye (*Elymus canadensis*) - - - is generally distributed throughout the cooler portions of the United States and finds its most suitable soils and climate in the northern Great Plains, in the Pacific Northwest, and at higher elevations in the Southwest. It is a vigorous, tall-growing perennial that produces an abundance of foliage and seed. As forage the grass is somewhat unpalatable, but this is offset by the very rapid germination and quick vegetative cover furnished by newly planted seedlings. Under heavy grazing this is one of the first species to disappear; but, if properly protected, it becomes quickly reestablished and supplies excellent protective ground cover.



Although found generally throughout the Western States, blue wild-rye (*Elymus glaucus*) is most abundant in the Pacific Northwest, where it is considered valuable both for range forage and erosion control. It is much like Canada wild-rye in habit of growth.

BLUEGRASS

Big bluegrass (*Poa ampla*) is the most important of a group of native bluegrasses common to the Western States. Although seldom found in dense stands, it is one of the most valuable range grasses of the intermountain region of the Pacific Northwest because of its heavy forage production, high palatability, and tendency to resume early spring and fall growth. This species is very drought-resistant.

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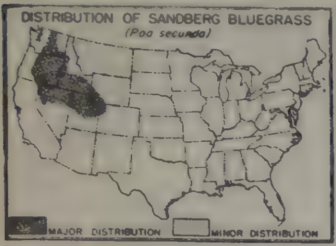
Sandberg bluegrass (*Poa secunda*) is common throughout the northern Great Plains, but the area of major distribution is in the intermountain region and Pacific Northwest. It is a perennial bunch grass that supplies a major part of the range forage during the early spring and remains dry and dormant the rest of the season. It is very drought-resistant and comes up and persists on semidesert and scabland where other native grasses have disappeared. This persistence is largely due to the fact that the plant is exceptionally deep-rooted and thus able to withstand trampling by livestock. - - -


DISTRIBUTION OF SANDBERG BLUEGRASS (*Poa secunda*)

Kentucky bluegrass (*Poa pratensis*) and Canada bluegrass (*P. compressa*) are introductions from the Old World that have become naturalized and are present generally in the cool, humid northern half of the United States east of the 99th meridian. - - -

Both of these grasses form a dense, tough sod, capable of withstanding trampling by livestock. In the past it was thought that Kentucky bluegrass would grow only on limestone soils, but it is now understood that it is fertility rather than lime that is essential. Canada bluegrass is more drought-resistant and is adapted to less fertile soils than Kentucky bluegrass. Both of these grasses are highly palatable and withstand grazing. This and their excellent seed and sod-forming habits make them very useful for erosion control.

SUDAN GRASS

Sudan grass (*Sorghum vulgare* var. *sudanense*) was introduced from north Africa in 1909. It resembles Johnson grass in general appearance, but being an annual and lacking rootstocks, it does not become troublesome as a weed. Adapted to the same general soil and climatic conditions as sorghum. It has been grown with success practically throughout the United States.

BUFFALO GRASS

Buffalo grass (*Buchloë dactyloides*), a native sod grass, is the most characteristic plant of the short-grass associations of the semiarid Great Plains.

Buffalo grass makes a close, even turf, produces a large amount of nutritious forage, and forms a most effective erosion-resistant sod. In the southern Great Plains it ranks first among the native grasses for wind-erosion control, possessing all the characteristics desired for this purpose except that of producing heavy seed crops. Being very drought-resistant, it does well throughout the region except on very sandy soils. It spreads rapidly by means of stolons and withstands heavy grazing.

BLUESTEM

The bluestems comprise a very large group of grasses that is particularly well represented throughout the warmer regions of the world.

Big bluestem (*Andropogon furcatus*) is generally distributed throughout the eastern part of Oklahoma, Kansas, Nebraska, and South Dakota, but in the western part of these States, where climatic conditions are more severe, it is found only in scattered stands on the most favorable sites. The plants are usually tall, leafy, and of a bunch habit of growth. They produce excellent pasture and hay. They also furnish effective protection against erosion, owing to the retention of the top growth and the deep penetration of the extensive root system.

Sand bluestem (*Andropogon hallii*), like big bluestem, is considered excellent for forage and erosion control, but it is distinguishable from big bluestem by its heavy rootstocks and is especially adapted to very sandy soils. It is therefore one of the most desirable of the native grasses for use on sandy "blow soils." - - -

Little bluestem (*Andropogon scoparius*) is generally distributed throughout Nebraska, Kansas, Oklahoma, the blackland belt of south-central Texas, northern New Mexico, northern Arizona, Utah, and western Colorado. Principally because of its leafiness and vigorous root system, it is a very good erosion-control plant. Although it is highly palatable throughout most of its range, particularly during the early stages of growth, in the northern Great Plains it is considered only fair to poor as a pasture grass since there it soon becomes rather coarse and cattle do not graze it readily.

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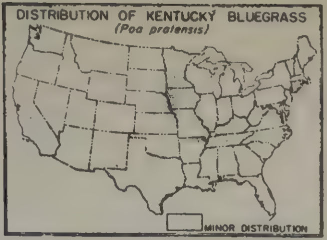
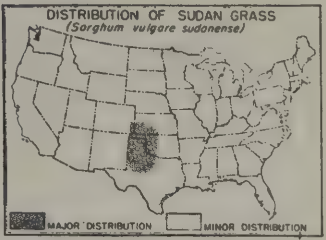
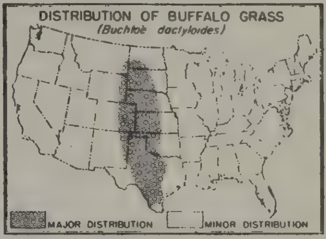
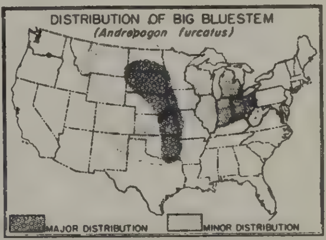
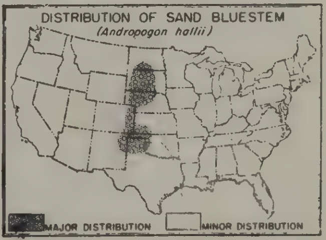
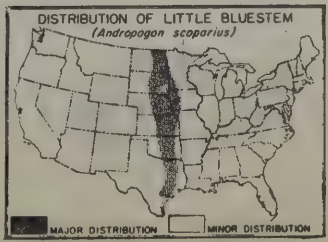

DISTRIBUTION OF KENTUCKY BLUEGRASS (*Poa pratensis*)


DISTRIBUTION OF SUDAN GRASS (*Sorghum vulgare sudanense*)


DISTRIBUTION OF BUFFALO GRASS (*Buchloë dactyloides*)

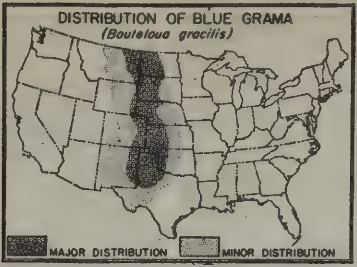

DISTRIBUTION OF BIG BLUESTEM (*Andropogon furcatus*)


DISTRIBUTION OF SAND BLUESTEM (*Andropogon hallii*)


DISTRIBUTION OF LITTLE BLUESTEM (*Andropogon scoparius*)

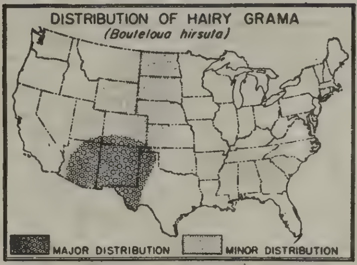
GRAMA

Five of the grama grasses are used extensively for revegetation of range lands. Characteristically, they are a part of the short-grass flora of the Great Plains and are a valuable constituent of the cover on the range land of that area.


DISTRIBUTION OF BLUE GRAMA (*Bouteloua gracilis*)

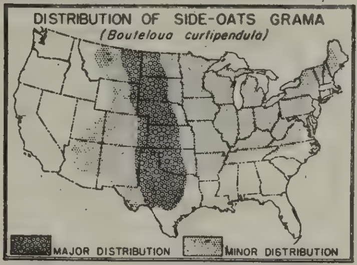
Blue grama (*Bouteloua gracilis*) occurs generally throughout the dry portions of the Great Plains.

Blue grama has a relatively shallow but very dense root system and, although well adapted to heavy soils, it is by no means restricted to soils of this type. Because of its high palatability and grazing capacity, as well as its wide soil and climatic adaptation, this grass is excellent as range forage and ranks high for use in range and pasture revegetation.


DISTRIBUTION OF HAIRY GRAMA (*Bouteloua hirsuta*)

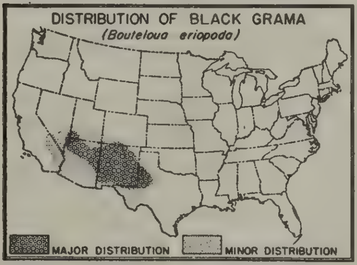
Hairy grama (*Bouteloua hirsuta*), a native perennial, is found in scattered stands throughout most of the Central and Rocky Mountain States. It reaches its maximum usefulness as a range plant in Arizona and New Mexico, where it occurs in mixtures with other grasses.

It is adapted to the same general soil and climatic conditions as blue grama and, like this grass, tends to form sod in the North and to assume a bunch habit of growth in the South.


DISTRIBUTION OF SIDE-OATS GRAMA (*Bouteloua curtipendula*)

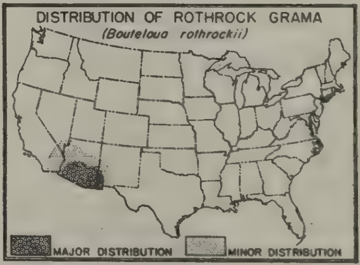
Side-oats grama (*Bouteloua curtipendula*) is the most widely distributed of all the gramas and is found generally throughout the United States east of the Rocky Mountains.

Although a perennial with scaly rootstocks, side-oats grama generally assumes a bunch habit of growth. It is found in association with other gramas and because of its leafiness is prized as a forage plant. The stems, however, are not palatable and often remain standing after the leafy foliage has been eaten by livestock.


DISTRIBUTION OF BLACK GRAMA (*Bouteloua eriopoda*)

Black grama (*Bouteloua eriopoda*) is distributed more or less generally through southern New Mexico and Arizona and western Texas. It is one of the good forage grasses of the Southwest. The fact that it spreads by tillers and stolons gives it a high rank as a soil-binding plant and makes it very effective in erosion control.

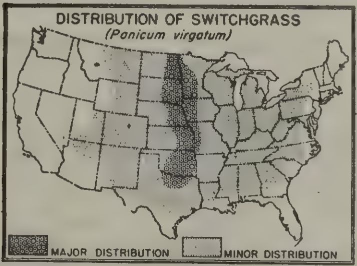
Rothrock grama (*Bouteloua rothrockii*) occurs in the southern half of Arizona and southwestern New Mexico, where it often forms extensive pure stands.


DISTRIBUTION OF ROTHROCK GRAMA (*Bouteloua rothrockii*)

It is an erratic, short-lived perennial, resembling blue grama except for the more numerous flower spikes. Ranchers consider it better than the annual gramas but not as valuable as the blue and hairy gramas, with which it is frequently associated.

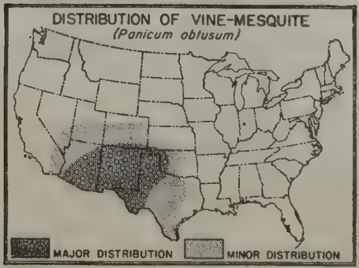
This grass does not withstand overgrazing, but during favorable periods the number of plants increases rapidly because of good seeding habits.

PANIC GRASSES


DISTRIBUTION OF SWITCHGRASS (*Panicum virgatum*)

Switchgrass (*Panicum virgatum*) is a native perennial that occurs widely throughout the United States but reaches its greatest usefulness in the Great Plains.

This grass develops extensive rootstocks and produces an abundance of leafy forage, which makes a hay of acceptable quality if cut at the proper stage of growth. If switchgrass is grazed, the excess foliage soon becomes harsh, woody, and unpalatable to livestock, although it continues to supply abundant ground cover.


DISTRIBUTION OF VINE-MESQUITE (*Panicum obtusum*)

Vine-mesquite (*Panicum obtusum*) is found generally in western Texas, Arizona, New Mexico, and southern Colorado. It forms a characteristically viny growth and occurs more commonly on good soils that have more than the normal amount of moisture.

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HILARIA

Hilaria is a small genus of grasses especially adapted to the semiarid Southwest. These grasses have high value in the soil and moisture conservation practices of this region.

Tobosa grass (*Hilaria mutica*) is most extensive in southern Arizona and New Mexico and in western Texas. A strongly tufted perennial it is confined chiefly to heavy soils, especially in swales that are occasionally subjected to floodwaters. Tobosa grass withstands grazing, but is relatively unpalatable after maturity because of the retention of dead leaves from one winter season to another. The new growth, however, supplies excellent forage before it becomes tough and woody. It is a good soil-binding plant, and its value in erosion control is augmented by the accumulated mass of dead foliage, which furnishes an excellent protective cover.

Galleta grass (*Hilaria jamesii*) grows most abundantly in the western half of the Texas Panhandle, westward through Colorado, New Mexico, the northern half of Arizona and Nevada into California.

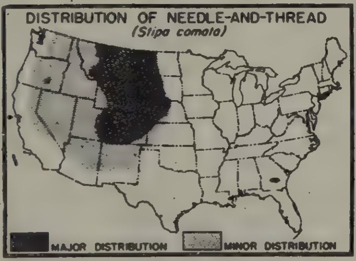
Galleta is a perennial grass with strong, scaly rootstocks and a deep, tenacious root system, which give it excellent soil-binding properties. It is one of the best forage grasses throughout its range, particularly in that it is resistant to heavy grazing and recovers rapidly when given protection from overgrazing.

Curly mesquite (*Hilaria belangeri*) is a range grass that grows rather generally throughout southern New Mexico and Arizona and occurs also in scattered stands over wider areas of the Southwest. Its tufted stoloniferous habit, which gives it excellent soil-binding properties, its resistance to drought, and its aggressiveness under heavy grazing make it one of the best erosion-control grasses of the Southwest.

NEEDLEGRASS

Needle-and-thread (*Stipa comata*) is a leafy bunch grass and is commonly found throughout the Western States on dry sandy soils. It produces an abundance of forage, particularly during early spring and summer.

This grass is held in great esteem by some range men, although others feel it is more or less of a pest because of its heavy, sharp awns, which cause injury to grazing animals at certain seasons. In most regions a large amount of grazing is possible early in the season before the grass matures; and during some seasons very acceptable hay can be cut after the seed has shattered.



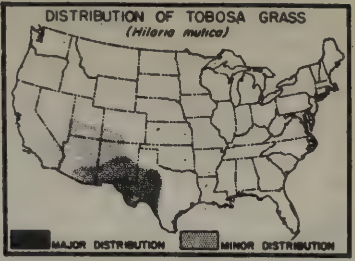
Green needlegrass (*Stipa viridula*) is a perennial bunch grass that is particularly useful on the ranges of the northern Great Plains.

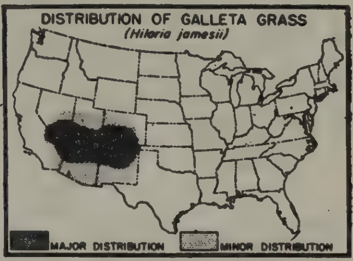
It is considered an excellent forage grass chiefly because it begins growth early in the season and remains green for a long period. Although the species bears abundant awns they are short and slender and not as objectionable as in some of the other needlegrasses.

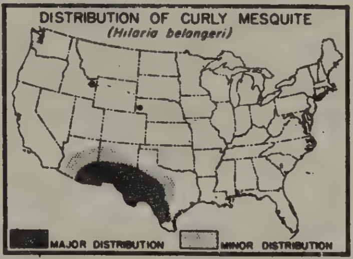
DROPSEED

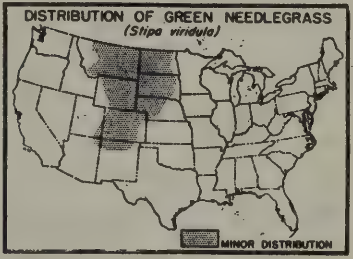
Alkali sacaton (*Sporobolus airoides*) is very common in all States west of the Mississippi River and, as the name indicates, is especially resistant to alkali soils. It is a large perennial bunch grass, which produces a fair quality of hay if cut at the proper stage of development. If allowed to mature, the plants become woody and more or less unpalatable either for hay or grazing.

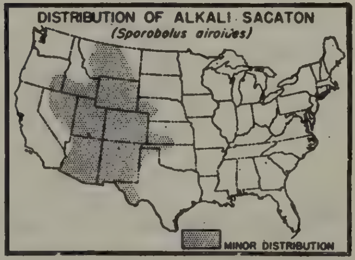
Sand dropseed (*Sporobolus cryptandrus*) is distributed generally throughout the United States, but is especially well adapted to climatic conditions in the States west of the Mississippi River. It is an important constituent of the native grasses of the Great Plains and, as the name "sand dropseed" indicates, is commonly found on sandy soils. It produces rather heavy forage that is fairly palatable to all classes of livestock but care is necessary to avoid destroying the stand by overgrazing. This grass recovers rapidly, however, owing to its excellent seeding habits.

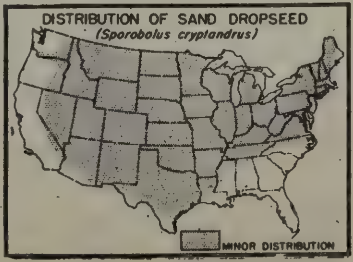




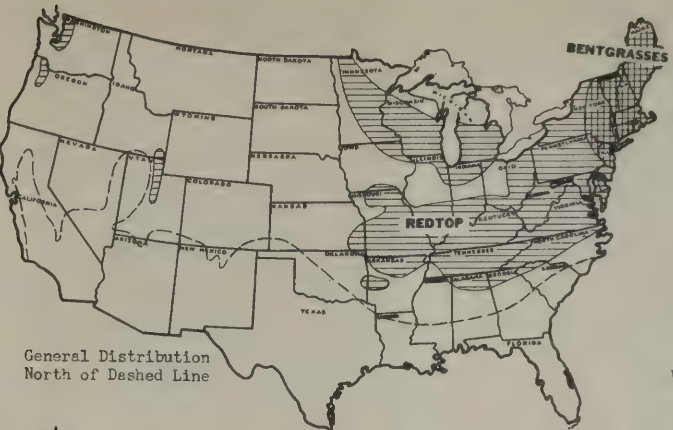








GRASSES OF CENTRAL AND EASTERN UNITED STATES



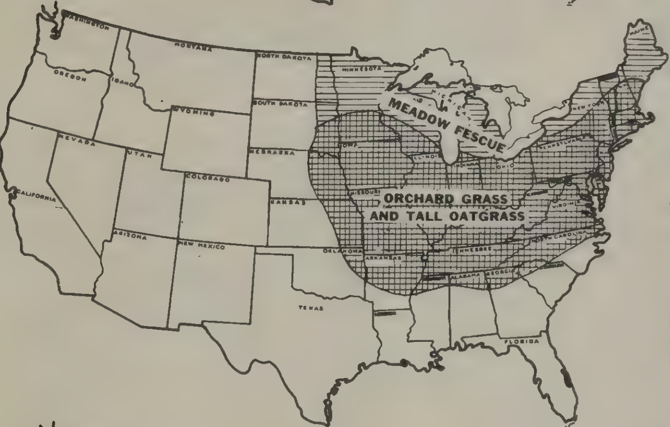
General Distribution
North of Dashed Line

WHERE REDTOP AND BENTGRASSES ARE WELL ADAPTED AND OF PRIMARY IMPORTANCE

Redtop is valuable for both hay and pasture on wet or acid soils, and the bentgrasses, because of their fine turf, are used extensively on lawns and golf courses. These grasses also thrive equally as well in the north Pacific region. The use of the bentgrasses for fine turf is common throughout the whole redtop region. Redtop is most highly regarded in areas like southern Illinois, where most of the seed is produced. It seems better suited to the poorly drained, rather unproductive clay soils of that section than any other grass.

WHERE ORCHARD GRASS, TALL OATGRASS, AND MEADOW FESCUE ARE WELL ADAPTED AND OF PRIMARY IMPORTANCE

Orchard grass is more tolerant of shade than bluegrass and produces better on poor soils. It is valuable in pasture mixtures and is more common than tall oatgrass.

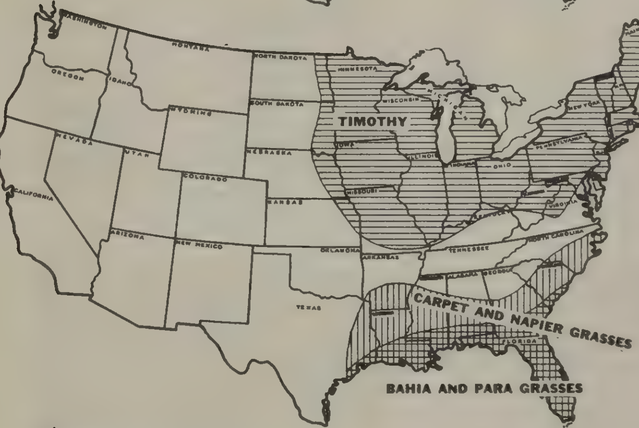


BLUEGRASS

(Kentucky and Canadian Bluegrass are included with other bluegrasses under "Grasses of the Great Plains and Western States," Page 171.2.)

WHERE TIMOTHY IS WELL ADAPTED AND OF PRIMARY IMPORTANCE

Timothy was introduced from Europe by the early settlers and has spread over practically all of the humid part of the United States north of the 60 degree isotherm. This grass is also common in the north half of a narrow border along the Pacific coast. This is one of the leading hay and pasture grasses of the United States and adjoining sections of Canada.

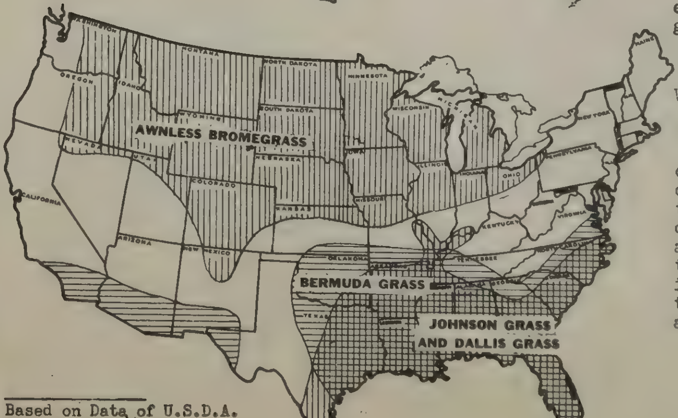


WHERE CARPET, NAPIER, BAHIA AND PARA GRASSES ARE WELL ADAPTED AND OF PRIMARY IMPORTANCE

These grasses are more tropical and less winter-hardy and as a result are confined almost entirely to the sections of the United States indicated and to extreme southern parts of California and Arizona. Carpet grass is much more common than the other three. Napier grass, because of its large, coarse growth, may be used effectively as a soiling or sillage crop in addition to its value as a supplemental pasture.

WHERE AWNLESS BROMEGRASS IS WELL ADAPTED AND OF PRIMARY IMPORTANCE

Awnless bromegrass is extremely winter-hardy, and is very drought-resistant. It was introduced from Europe and is most useful in the northern parts of the Great Plains and of the inter-mountain region. Bromegrass, is also proving valuable in the North Central states in pastures and meadows, especially in mixtures with alfalfa. The chief objection is the difficulty encountered in eradicating it. Grazing animals find the grass very palatable.



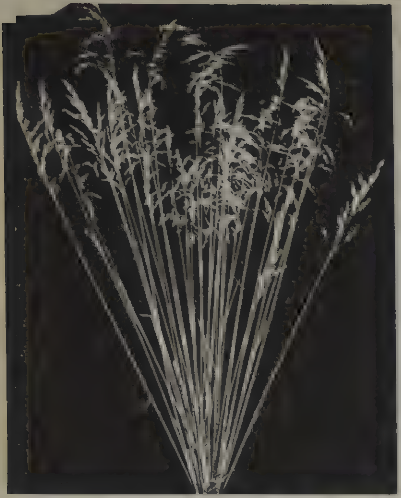
WHERE BERMUDA, JOHNSON, AND DALLIS GRASSES ARE WELL ADAPTED AND OF PRIMARY IMPORTANCE

Bermuda, Johnson, and Dallis grasses together with carpet grass are the principal hay and pasture grasses of the Cotton Belt. All were introduced at a comparatively early date and have spread naturally over most of the cotton region. Bermuda grass and Johnson grass are sensitive to low temperatures and grow only during the frost-free period. Both Johnson and Bermuda grasses invade irrigated and cultivated lands and are difficult to control. They are frequently rated as serious weeds as they are difficult to eradicate.

Based on Data of U.S.D.A.
U. of Ill. Bul. 404

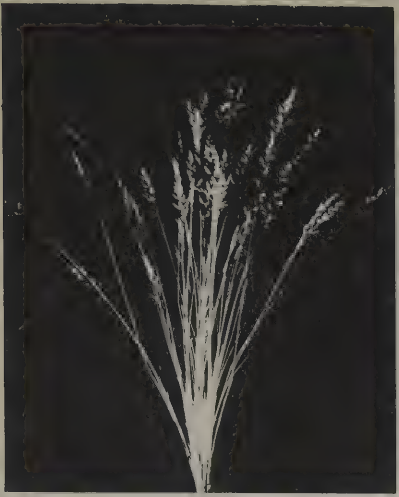
DOANE AGRICULTURAL DIGEST Released Jan., 1942
This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

GRASSES OF CENTRAL AND EASTERN UNITED STATES



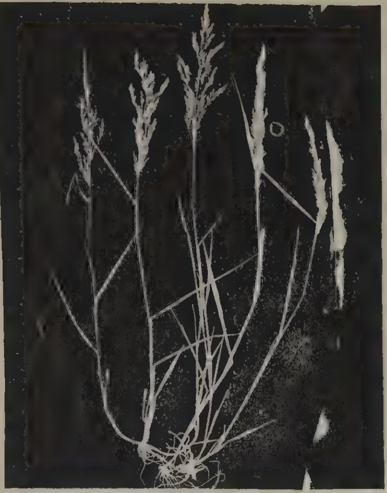
KENTUCKY BLUE GRASS

Is the most important [illegible] of most permanent pasture mixtures in Illinois. It comes in naturally over much of the corn belt



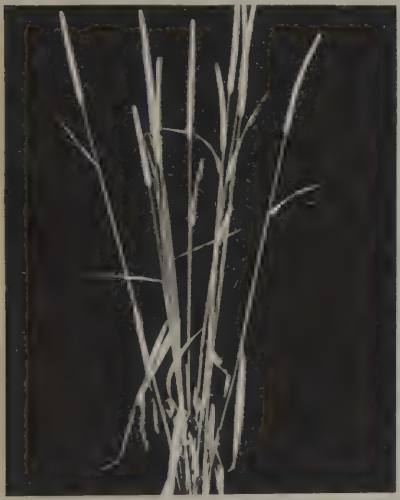
CANADA BLUE GRASS

[illegible] Kentucky bluegrass [illegible] Kentucky bluegrass [illegible]



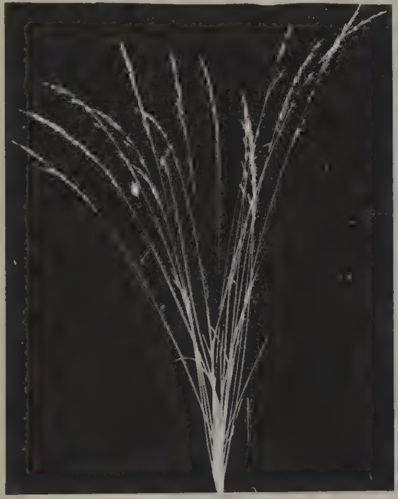
REDTOP

Is the second most important permanent pasture grass in this country. It forms a turf more rapidly than do most perennial pasture grasses and is highly resistant to drouth



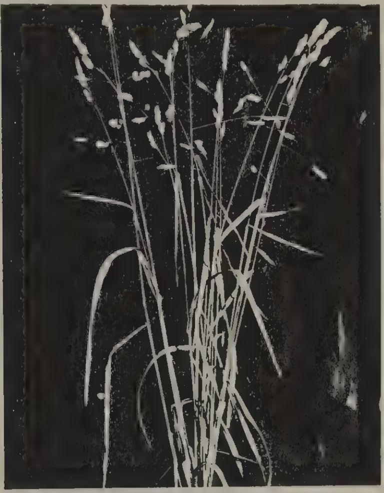
TIMOTHY

Is one of the most valuable forage grasses and where adapted should be part of most pasture mixtures. [illegible] wide range of soils [illegible]



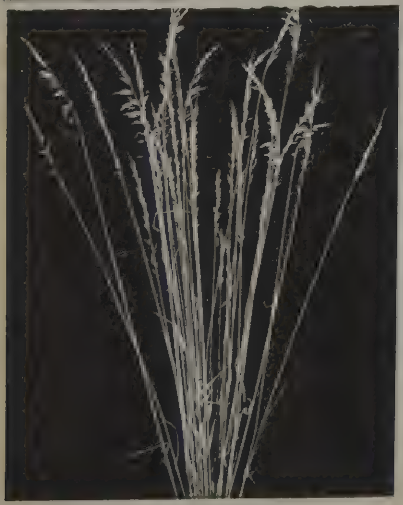
MEADOW FESCUE

Is adapted to the same regions as timothy but is usually grown on moist, rich soils. Fescue is used in mixtures for grazing and to some extent for hay



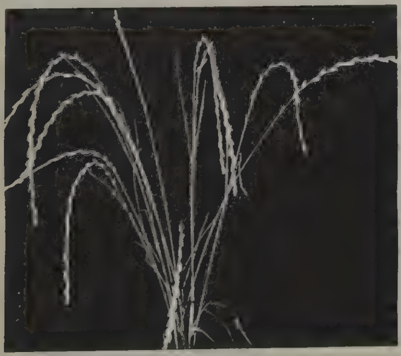
ORCHARD GRASS

Is the outstanding forage grass for shaded areas. It is a typical bunch grass and will withstand more drouth and heat than timothy but does not as a rule stand severe winters [illegible]



TALL OATGRASS

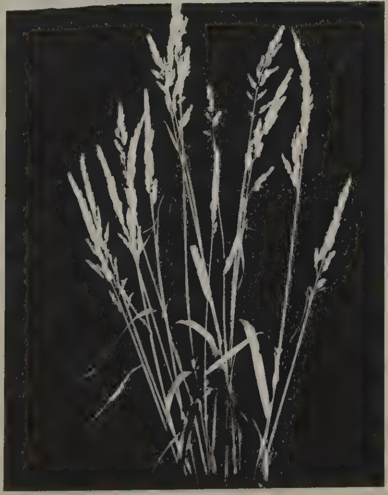
While not so palatable as timothy this grass is adapted to poor sandy or gravelly soils. It is very drouth resistant, being excelled in this respect only by bromegrass and the wheat grasses



RYEGRASS

Will form a turf more quickly than any other grass commonly grown in Illinois and is therefore often recom   It thrives

The general characteristics and the special advantages or adaptation of the different grasses should be given careful consideration before an attempt is made to establish a permanent meadow or pasture.



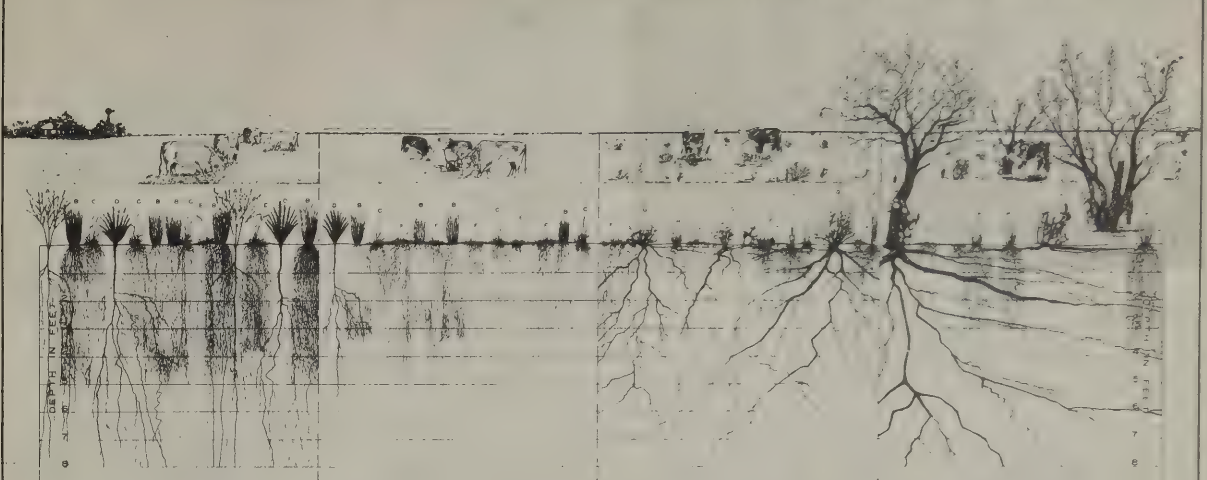
REED CANARY GRASS

Is the outstanding forage grass for swampy, fertile soils. It forms a dense sod heavy enough to support the weight of cattle even on low marshy land. The leaves stay green all thru the grazing season.

Circular No 465
University of Illinois

RANGE GRASS MANAGEMENT

FOUR RANGE CONDITION CLASSES IN CENTRAL TEXAS



EXCELLENT CONDITION
Little bluestem, Sideoats grama and non-grassy herbs are most prominent plants. Roots penetrate deeply.

GOOD CONDITION
Buffalograss has invaded and is about as prominent as Little bluestem and Sideoats grama. Non-grassy herbs are scarce, root systems are shorter

FAIR CONDITION
Short grasses dominate. Mesquite and other woody vegetation have invaded Non-grassy herbs have been killed and grass roots have shortened.

POOR CONDITION
Woody vegetation, Needlegrass and inferior weedy vegetation have replaced the better forage plants

-LEGEND - A-WILD ALFALFA B-LITTLE BLUESTEM C-SIDEOATS GRAMA D-BLAZING STAR E-HAIRY GRAMA F-BUFFALOGRASS
G-MESQUITE H-SILVER BLUESTEM I-CACTUS J-TEXAS SPEARGRASS K-THREEAWN

U. S. DEPARTMENT OF AGRICULTURE Soil Conservation Service

4-R 5057

The long-time range picture is bad. Top-notch range grasses have been disappearing for generations. The heavy range use by record cattle numbers during the war has tended to cover up this fact and has been possible only because of abnormally high rainfall in most sections. Deterioration is greater than improvement. In the face of climbing human population, this means decreased meat per person for the future and less ranch income.

The problem is illustrated above. The four pictures show four stages in what is called "plant succession", which means the natural changes in plant life which occur as range condition goes up or down. The stage shown on the extreme left is called the "climax" or most desirable stage.

Unfortunately, many millions of acres of range land, formerly in the "climax" stage, are now in the extremely poor stage shown on the right. A thorough understanding of how and why this happened is essential to good range management.

Ignorance, greed and the feeling in the past that range land was unlimited all contributed to range abuses. There are two specific causes:

1. Indiscriminate plowing, and
2. Poor grazing practices.

Plowing took place under unwise homestead requirements and on soils that appeared deep enough to grow crops, while overgrazing occurred on all types of range soil. The result has almost always been the destruction of a balanced grass relationship. As this happens, less desirable grasses begin to take over, and the longer the mal-practices continue, the less nutritious becomes the range. Competent managers must know what their land is capable of producing, which grasses are "climax" and which are weed types and how to establish the one and eliminate the other.

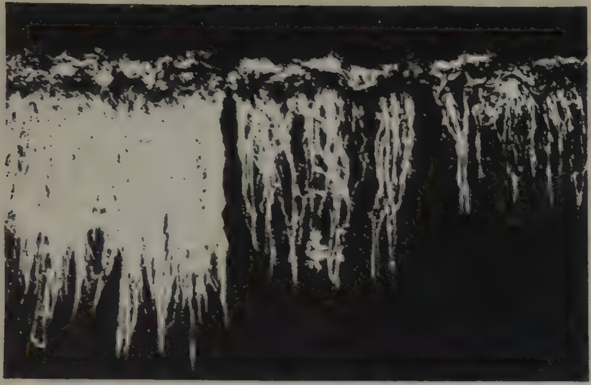
Range land should be restored to its optimum grazing condition and then maintained at that high level.

Most authorities agree that the most economical way to restore range which has not degenerated too far is by removing the cause of the trouble and allowing nature to restore it via the succession route.

Seldom is it possible to restore a range to its climax stage at one jump. It takes time. Nature's "succession" is her way of using certain vegetation to prepare the way for other, better types of life. Thus, the soil may have changed so much throughout the years that you will have to determine what the first upward step in the range succession is and then establish that stage. There will follow, under good management and a little help here and there, the long, slow and natural regeneration of the pasture grasses of climax types.

What is "OVERGRAZING"?
Overgrazing means not only "excess" grazing. Early grazing (trampling, puddling) and grazing too late in the season, which reduces root food storage and interferes with maximum seed formation, are also part of overgrazing. Excessive grazing during the regular or normal true pasture season by either too many cattle or for too long at one time diminishes the size of roots and the depth to which they penetrate, thus limiting intake of soil nutrients and moisture.

RANGE GRASS MANAGEMENT



An illustration of the injurious effects of too close utilization of seedling grasses. Equal amounts of side-oats grama were planted on May 1 in three plots kept under very favorable conditions for growth. One lot of plants (left) was unclipped; the others were clipped on alternate weeks and a total of eight times by September 1. Clipping was at 4 inches height (center) and at 2 inches (right). Dry weight of roots freed from all soil was, from left to right, 60.5, 20.3, and 13.1 grams.

From Nebraska Conservation Bulletin 27 - February, 1945
Reproduced by U S D A Soil Conservation Service

This, in turn, diminishes surface coverage, which gives seeds of less desirable annual grasses, weeds and poisonous plants a chance to grow. Continuance of overgrazing favors the growth of these poorer species because of the preference livestock have for the dwindling desirable climax grasses. Finally, reducing the surface coverage exposes the soil to excessive and ruinous wind and water erosion, overheating from direct rays of sun, rapid evaporation, and retards the downward percolation of precious moisture.

HOW TO IMPROVE RANGE

1. Know the climax stage of your range. Digest pages 171.1 to 178.2 list and describe major and minor distributions of most of the important range and pasture grasses. Examination of protected areas is also a good way to get a rough idea of what your range could be.
2. Examine the range to see whether it is, at present, supporting any of these climax or high-succession types. If so, determine if their concentration is high enough to allow them to spread of their own accord if given the chance.

   There are several comparatively accurate methods of making these determinations. Use expert advice if you lack wide experience. "Old hands" in the range areas can accomplish much in range improvement by using their experience in applying approved practices.
3. Next, calculate as closely as possible how many acres per head are needed to allow the range to gradually regenerate so that it will go up the succession ladder rather than down. Again "old hands" can make pretty shrewd guesses as to a range's economic carrying capacity. Some trial and error will be necessary in many cases, but the manager always knows one thing; If the range doesn't improve with the first reduction in livestock numbers, more livestock will have to be removed.

WHY CLIMAX GRASSES?

Many ranges which are not in climax-type grasses are quite profitable. A rancher might well ask, "Why bother to improve my range? I'm doing all right!" There are reasons--and good ones.

1. It is rare to find a plot of ground anywhere under man's management which is not either deteriorating or improving. Either is often too slow to be easily detected. The safe method of management is to be sure the range is not going down by employing practices which achieve definite improvement. Experiments have shown that in most cases this is accomplished with immediate profit to the operator, rather than at a sacrifice. Actual range figures have been gathered showing higher per cent calf crops, heavier calf weights at weaning and more total pounds of beef sold when cattle numbers were reduced on ranges.

2. Grasses lower in the succession cycle than climax types are usually lower in nutritive value. This reduces carrying capacity. (See accompanying table comparing Bluestem and Buffalo grass.)

BLUESTEM GRASS VS. BUFFALO GRASS
FOR GRAZING YEARLING STEERS IN OKLAHOMA

An Average of Two Trials - 1942 - 1943

Kind of Pasture	Bluestem Grass	Buffalo Grass
No. of Days of Grazing	92	92
No. of Steers	19	18
Acres Provided per Steer	2.33	4
Av. Weights per Steer (Lbs.)		
Initial Weight	647	649
Final Weight	738	726
Total Gain	91	77
Appraisal Value per Cwt. ($)	13.25	13.25
Pounds of Gain Per Acre	40	25
Value of Gain Per Acre ($)	5.30	3.31

3. Climax types afford better surface coverage. This insulates soil and roots against temperature extremes and also helps to regulate evaporation.

4. The root systems of climax grasses are usually more extensive, thus insuring more organic material in the soil as well as stronger competition for invading plants which are less desirable or even harmful.

5. The root system of woody type vegetation is also very extensive, thus robbing grasses of badly needed moisture.

If climax vegetation types are thought of as evolutionary end-products which were produced through millions of years of savage competition and selection to make optimum use of the soil resources, it is easy to see why they serve the range manager best.

FINAL -- A Senate investigation over 10 years ago, THE WESTERN RANGE, Document 199, disclosed that, "Forage depletion for the entire range area averages more than half; the result of a few decades of livestock grazing."

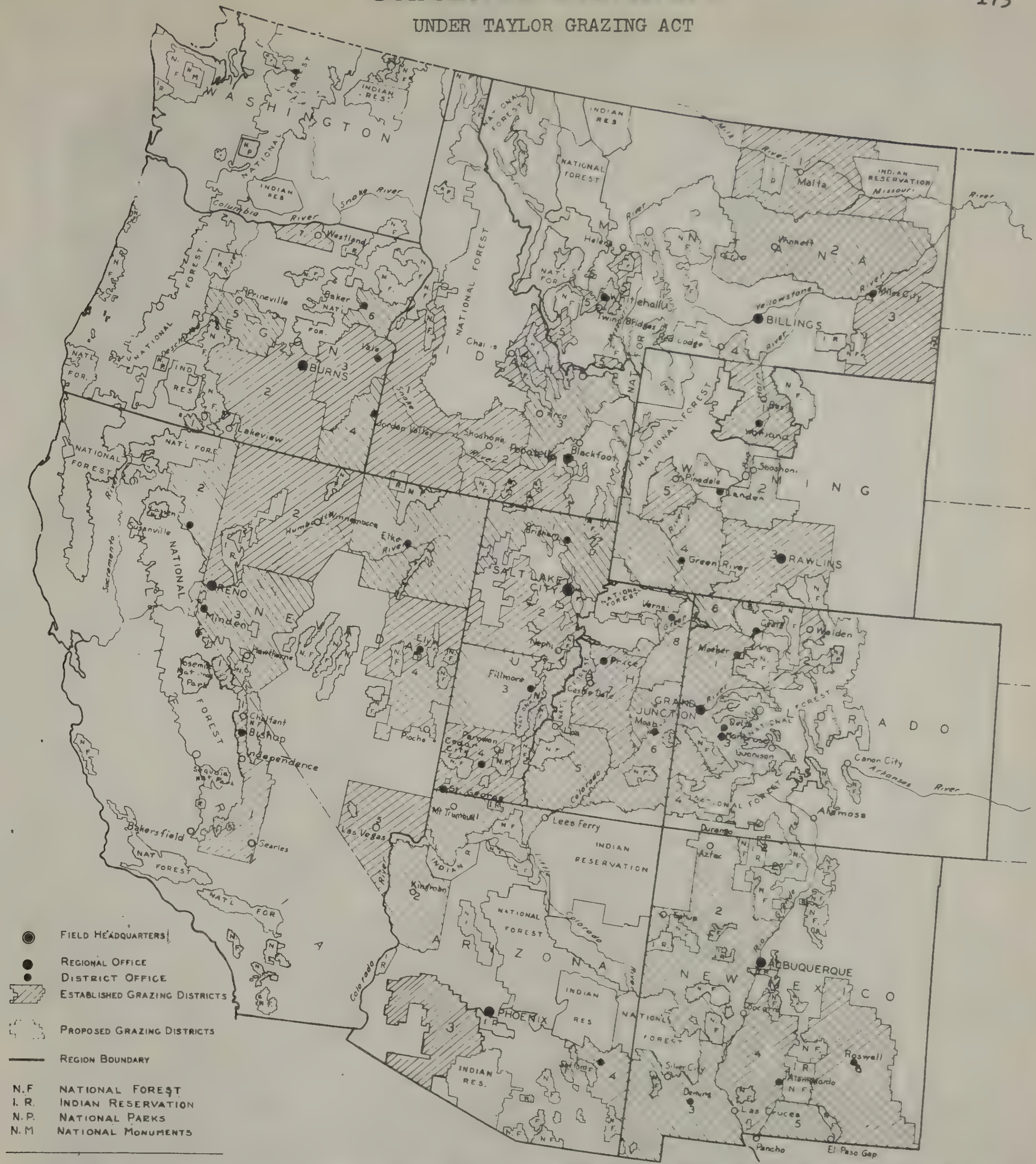
"Three-fourths of the entire range area has declined during the last 30 years, and only 16 per cent has improved."

☞ Do not be complacent over the apparent improvement in your range carrying capacity during the recent years. For most ranches it is as temporary as the increased rainfall. The most profits over a period of years can only be made on ranges that are maintained in "climax" grasses and forage for the ranch. The next severe drouth will again emphasize this fact.

All tables and graphs from U.S.D.A., Soil Conservation Service.

GRAZING DISTRICTS

UNDER TAYLOR GRAZING ACT



The Taylor Grazing Act was enacted June 28, 1934 to control the grazing of the public domain and restore and develop the public grazing lands. In 1938 there were fifty districts and 19,342 licenses were issued. Livestock grazed included: horses 108,925; cattle 1,605,566; sheep 9,221,696; and goats 96,455.

To be eligible for a regular license, an applicant must own or control property, own livestock, and must have used the range before the act became effective in connection with the property owned or controlled. Other things being equal, the ranch or farm that is located nearest the public range is given preference to its use.

The public lands administered by the Division of Grazing as of June 1938 by states were as follows: Nevada 34,389,258 acres; Utah 21,561,022 acres; Wyoming 11,778,686 acres; New Mexico 11,284,522 acres; Oregon 11,269,281 acres; Idaho 10,048,585 acres; Colorado 7,070,800 acres; Montana 5,084,967 acres; Arizona 3,770,249 acres; and California 3,117,968 acres.

DEPARTMENT OF THE INTERIOR
DIVISION OF GRAZING

THE RANGE AREA

THE RANGE AREA is that portion of the Western States in which cattle, sheep, and Angora goats are produced largely by utilizing the native grasses, browse, and other forages growing on large areas of land which cannot at this time be economically cultivated. A strip of territory varying in width from 25 to 150 miles extends irregularly in a north and south direction along the one-hundredth meridian may be considered the practical division between the farming area of the Eastern and the range area of the Western States. The range area constitutes approximately 45 percent of the total land area of the United States and may be divided into four parts: The Great Plains, Rocky Mountain, Intermountain, and Pacific coast regions.

THE GREAT PLAINS REGION

The Great Plains region constitutes the eastern portion of the range area, and its western boundary is formed by the foothills of the Rocky Mountains. The topography varies from the rough, broken, choppy surface which characterizes the Bad Lands of South Dakota to the level, timberless plains, typified by the Staked Plains of western Texas and eastern New Mexico. On the whole the Great Plains region is one of yearlong grazing; but from the Pan handle of Texas northward heavy snows cover some of the ranges for limited periods. . . . . . . Stockmen throughout the region utilize native pastures, so far as possible, during the entire year and thus avoid the expense of supplying hay or cottonseed cake, which are the principal supplemental feeds. In certain sections of the southern portion the sweet and grain sorghums and Johnson grass are used extensively as roughage. The grain from kafir, milo, hegari, and feterita is becoming more extensively used for fattening.

Wide variations in climatic conditions other than rainfall occur in this region. The summers in the northern portion are usually cool; but in the southern portion the dry, hot winds often cause high surface evaporation, which is detrimental to the proper growth of range grasses and crop production. Climatological studies indicate that 20 inches of rainfall in the northern is equivalent to 30 inches of rainfall in the southern Great Plains, owing to the high surface evaporation in the latter. Seventy percent of the annual precipitation occurs between April 1 and September 30. This fact is especially worthy of notice, because a dry fall permits the curing of the native grasses on the range into a very desirable quality of feed.

THE ROCKY MOUNTAIN REGION

The Rocky Mountain region comprises the principal ranges of mountains that make up the Rocky Mountain system, their adjacent spurs, and the intervening areas of farming and grazing land of lower altitude than the mountains proper. The topography of the region varies from the more or less level valleys to the rugged areas found at different altitudes. In many instances the foothills are smooth and rolling and support growths of sagebrush or other shrubs of varying density, while in the higher elevations timber abounds, except in the extremely high altitudes. Practically the entire region is national-forest range.

The national forest range of this region, with the exception of areas in New Mexico and Arizona that are utilized for winter grazing, is used for summer grazing only. The foothills and open ranges are grazed during the winter as climate and forage conditions permit, but much dependence is placed on privately owned pasture and farming lands for wintering purposes.

The winters are often severe and accompanied by heavy snowfall in the central and northern portions of this region. Usually the winters are milder in the southern portion. During seasons of severe winter storms, heavy feeding is the means used to prevent excessive losses. In the higher altitudes a relatively high percentage of the annual precipitation is in the form of snow, which furnishes water, where conserved, for irrigation in the spring and summer.

THE INTERMOUNTAIN REGION

The Intermountain region comprises the vast area of range lands lying between the Rocky Mountain and Pacific coast regions. The topography varies from mesas or gently inclining planes of variable area that occur throughout the region, but notably in Arizona, to the broken and rolling areas common in Nevada and southeastern Oregon. The characteristic range is arid or semiarid and more or less covered with sagebrush. A very large proportion of the open range or the "unappropriated and unreserved" public domain lies within this region.

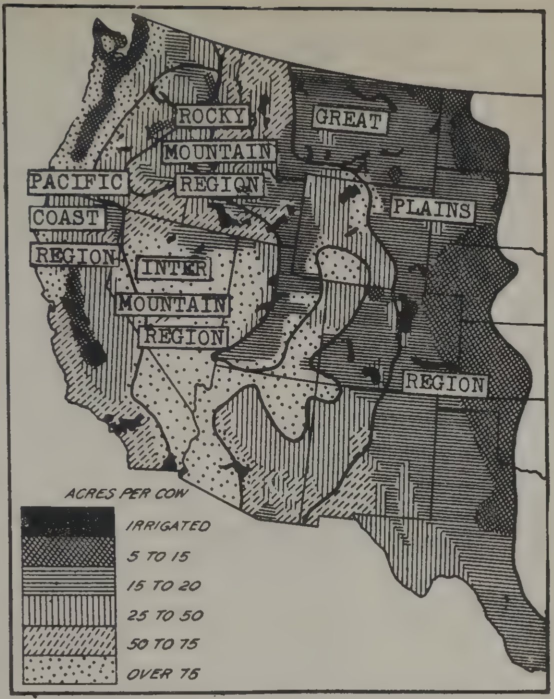
The national-forest range in this region is used for summer grazing. Some of the reserved public land is grazed throughout the year. Areas that do not have a sufficient water supply to permit their use during the summer are often used for winter ranges.

Practically all privately owned lands are under fence and in general are utilized for wintering purposes or holding pastures at various seasons of the year, particularly for weaning or caring for the weaker cattle.

A small portion of the privately owned land is devoted to farming, which is often limited to the production of hay for feed. Alfalfa hay is more commonly produced on the irrigated land and native-grass hays in the moist valleys.

In the northern portion of this region from 30 to 40 percent of the annual precipitation occurs between April 1 and September 30, and in the southern portion, from 40 to 50 per cent.

Selected from Farmers' Bulletin 1395



Carrying capacity of the ranges of the regions designated in figure 1. (Adapted from data compiled by Forest Service and Bureau of Agricultural Economics, Department of Agriculture, and General Land-Office, Department of the Interior.) The usual feed requirement for wintering and overcoming drought conditions should be considered in connection with the acreage shown above.

THE PACIFIC COAST REGION

The Pacific coast region comprises the western and northern three-fifths of Washington, the western third of Oregon, and practically all of California except those portions in the northeastern and southeastern parts included in the Intermountain region.

The topography varies from almost level valleys to the rougher sections within the mountain areas.

Areas of foothills more or less rolling in nature furnish a large percentage of the yearlong range.

Range conditions in the Pacific coast region are very similar to those in the Rocky Mountain region in that a large part of the grazing land is national forest and is utilized for summer grazing. In addition there are areas of open range which are of some value for grazing where it occurs in tracts large enough for extensive use, but it is generally utilized in connection with forest and privately owned lands.

The Great Plains is a region of summer rainfall, while the Pacific coast is one of winter rainfall. In the northern portion of the Pacific coast region only from 20 to 30 per cent of the annual precipitation occurs between April 1 and September 30, while in the southern portion the amount received between those dates does not exceed 20 per cent of the total. This factor often results in scant range during the summer, while the excessive rains in the winter reduce the feed value of native grasses for winter grazing. Snowfalls occur in the higher altitudes, but the climate is comparatively mild west of the mountains, especially where coastal influences prevail.

CARRYING CAPACITY AND IMPROVEMENT OF RANGES

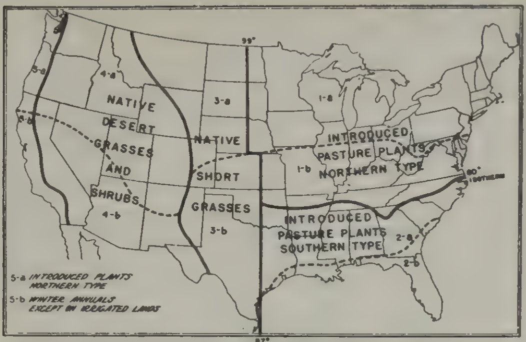
The range map is compiled from estimates, and in considering the number of acres per cow one must not lose sight of the fact that the length of the grazing season is a matter of great importance.

Summer ranges must of necessity be supplemented with winter ranges or winter feed, for which provision must be made. When winter range is reserved the number of acres necessary to carry a cow for a year will be materially increased, and in the event of winter feeding the amount of farming land will be a matter of consideration.

Many stockmen, when they consider range improvement, think first of artificial reseeding. Investigations on the typical range areas of the West have definitely shown that natural revegetation is far more practicable than attempts at artificial reseeding.

To apply the deferred and rotation system of grazing the range should be divided into several pastures of equal holding capacity according to varieties of forage, so that one or more pastures can be maturing while the others are being grazed. / Selective grazing is a system that permits the use of the range throughout the growing season. This system, applied with a maximum rate of stocking to permit a reserve of 10 to 15 percent of the old grass on the range at the beginning of spring, is held in higher favor by practical stockmen than any other plan of range improvement and conserva-

PERMANENT PASTURE


99°
97°
80°
NATIVE DESERT GRASSES AND SHRUBS
NATIVE SHORT GRASSES
INTRODUCED PASTURE PLANTS NORTHERN TYPE
INTRODUCED PASTURE PLANTS SOUTHERN TYPE
1-a
1-b
2-a
2-b
3-a
3-b
4-a
4-b
5-a
5-b
5-a INTRODUCED PLANTS NORTHERN TYPE
5-b WINTER ANNUALS EXCEPT ON IRRIGATED LANDS

Map showing types of pasture plants that provide the majority of the pasturage in each part of the United States.

PLANT MIXTURES FOR DIFFERENT SECTIONS OF THE UNITED STATES

It is seldom advisable to seed land intended for a permanent pasture to one grazing plant. A mixture of several kinds, especially of grasses and legumes, has many advantages, among which may be mentioned the following:

(1) Legumes in pasture mixtures help to maintain the nitrogen content of the soil and reduce the need of nitrogen fertilizers.

(2) Mixtures result in a more uniform stand and higher production, because several soil conditions are often represented in a pasture, and in a mixture plants adapted to each soil condition are likely to be found.

(3) Mixtures provide a more uniform seasonal production because the periods of flush growth and dormancy vary in different plants.

(4) Mixtures of grasses and legumes provide a better balanced ration, since legumes are richer than grasses in both protein and minerals.

The following mixtures are recommended for each section of the United States where permanent pastures of the highest productivity are desired. The cost of the necessary seed may seem an extravagance, but this investment is usually returned within the first 2 years because of the higher productivity of pastures thus seeded.

NORTHEASTERN STATES (SECTION 1–a)

Good, well-drained soils

Mixture:	*Pounds per acre*
Kentucky bluegrass	5 or 6
Orchard grass	4 or 5
Timothy	4 or 5
Redtop	2 or 3
Alsike clover	2 or 2
Red clover	2 or 2
White clover	1 or 2
Total	20 or 25

Poor, well-drained soils

Mixture:	*Pounds per acre*
Orchard grass	8 or 10
Canada bluegrass	5 or 6
Redtop	4 or 5
Alsike clover	2 or 3
White clover	1 or 1
Total	20 or 25

In Iowa, Minnesota, and the Dakotas, bromegrass may be substituted for orchard grass in these mixtures.

Wet, poorly-drained soils

Mixture:	*Pounds per acre*	Mixture:	*Pounds per acre*
Timothy	4 or 6	Reed canary grass	5 or 8
Redtop	8 or 10	Redtop	4 or 4
Alsike clover	3 or 4	Alsike clover	1 or 3
Total	15 or 20	Total	10 or 15

Reed canary grass may be sown alone at the rate of 8 to 12 pounds per acre on land likely to be submerged for a part of the year, and excellent pasture obtained thus from land otherwise unproductive.

EAST CENTRAL STATES (SECTION 1–b)

Good, well-drained soils

Mixture:	*Pounds per acre*
Kentucky bluegrass	5 or 6
Orchard grass	4 or 5
Timothy	2 or 3
Redtop	2 or 2
Lespedeza	6 or 7
White clover	1 or 2
Total	20 or 25

Poor, well-drained soils

Mixture:	*Pounds per acre*
Orchard grass	5 or 6
Tall oatgrass	4 or 5
Redtop	4 or 5
Lespedeza	7 or 9
Total	20 or 25

Wet, poorly drained soils

Mixture:	*Pounds per acre*	Mixture:	*Pounds per acre*
Timothy	5 or 6	Meadow foxtail	4 or 5
Redtop	8 or 10	Redtop	8 or 10
Alsike clover	3 or 4	Alsike clover	4 or 5
Total	16 or 20	Total	16 or 20

In the northern part of this section the Korean lespedeza should be used; in the southern part, Common, Kobe, or Tennessee 76 are best. The latter two varieties are usually more productive than the Common, but good results are obtained from a mixture of Common and Korean in Tennessee and North Carolina.

SOUTHEASTERN STATES (REGION 2)

Moist, sandy soils

Mixture:	*Pounds per acre*
Carpet grass	5 or 6
Dallis grass	3 or 4
Lespedeza	12 or 15
Total	20 or 25

Clay, loam, or clay or silt loam soils

Mixture:	*Pounds per acre*
Bermuda grass	5 or 6
Dallis grass	3 or 4
Lespedeza	10 or 12
White clover	2 or 3
Total	20 or 25

Common, Kobe, and Tennessee 76 lespedezas are the varieties to use in region 2. Bermuda grass is usually started by planting pieces of sod rather than seed.

GREAT PLAINS AND INTERMOUNTAIN REGIONS (REGIONS 3 AND 4)

In the Great Plains (region 3) and in the Intermountain regions (region 4) the climate varies from semiarid to arid or desert conditions, and pastures are chiefly extensive areas or ranges occupied by native grasses, legumes, woody shrubs, and other plants of some value for grazing. This is true with two exceptions, the irrigated districts and the mountain valleys at high altitudes. In the Great Plains the herbage consists mostly of "short grasses" such as the gramas, buffalo, and mesquite grasses, while in the Intermountain region bunch grasses and desert shrubs predominate at the lower altitudes. This native flora is the main source of pasturage, and proper methods of grazing designed to protect and encourage the most valuable grazing plants are more important than the improvement of grazing conditions by seeding tame or introduced plants.

In the northern parts of these areas (sections 3–a and 4–a), when it is desired to restore to grazing condition land that has been cultivated, crested wheatgrass, bromegrass, or slender wheatgrass may be seeded in localities that are favorably situated as to rainfall. All are drought-resistant, nutritious, and palatable. Their value for grazing is about in the order named. Mixtures of slender wheatgrass and sweetclover are also recommended.

The productiveness of pastures in the high mountain valleys may be increased by seeding timothy, redtop, Kentucky or Canada bluegrass, meadow foxtail, and red, alsike, and white clovers, alone or in mixtures. Crested wheatgrass, bromegrass, and slender wheatgrass will also thrive under these conditions.

NORTHERN PART OF REGIONS 3 AND 4

For irrigated lands

Morton's mixture (modified):	*Pounds per acre*	Montana mixture:	*Pounds per acre*
Smooth bromegrass	9	Smooth bromegrass	3 or 4
Orchard grass	9	Kentucky bluegrass	4 or 6
Timothy	4	Orchard grass	4 or 6
Meadow fescue	5	Meadow fescue	3 or 4
Yellow sweetclover	3	White clover	1 or 2
		Alsike clover	1 or 2
Total	30	Total	16 or 24

Alfalfa or sweetclover seeded alone at the rate of 12 to 15 pounds per acre is used by many farmers on the irrigation projects with good results where care is observed to prevent bloating. The mixtures and also the legume pastures on well-drained soils ordinarily have a carrying capacity of two or more animal units per acre for 4 to 6 months, depending upon the latitude.

On wet or poorly drained soils a mixture consisting of redtop 10 pounds, timothy 6 pounds, and alsike clover 4 pounds ordinarily gives the best results.

In the South (sections 3–b and 4–b) the pastures on irrigated lands are largely either Bermuda grass or alfalfa. Dallis grass, another perennial, is adapted to these two sections and makes a more productive pasture on irrigated lands than Bermuda grass.

PERMANENT PASTURE

NORTHERN PACIFIC SLOPE (SECTION 5–A)

On the Pacific slope in section 5–a where rainfall is fairly abundant, especially during the winter season, the ryegrasses and bents thrive, and rather complicated mixtures are recommended.

For moist bottom land

Mixture:	Pounds per acre
Italian ryegrass	3
Perennial ryegrass	3
Meadow fescue	4
Kentucky bluegrass	4
White clover	2
Red clover	2
Alsike clover	2
Total	20

For fertile uplands

Mixture:	Pounds per acre
Italian ryegrass	4
Tall oatgrass	4
Orchard grass	4
Kentucky bluegrass	4
White clover	2
Red clover	2
Alsike clover	2
Total	22

For land subject to flooding for short periods

Mixture:	Pounds per acre
Seaside bent	5
Meadow foxtail	5
Italian ryegrass	4
Alsike clover	4
Total	18

For land subject to flooding for long period.

	Pounds per acre
Reed canary grass	8 to 12
or	
Seaside bent	8 to 10

The principal disadvantage in using seaside bent and meadow foxtail is in the excessive cost of the seed.

On irrigated lands in section 5–a the mixture recommended for moist bottomland is perhaps the best pasture for irrigated lands. Both alfalfa and Ladino clover seeded alone have been found to make unusually productive pastures for dairy cattle. There is, however, grave danger of losing some of the animals from bloating when either of these legumes are grazed.

In the southern part of the Pacific slope in section 5–b the summers are quite dry and the rainfall during the winter is light so that natural pastures consist largely of winter annuals which reseed each year. On the irrigated lands a large part of the pasturage is obtained from alfalfa fields. Ladino clover, Bermuda grass, and Dallis grass also do well here

SOUTHERN PACIFIC SLOPE (SECTION 5–B)

Irrigated lands [2]

Mixture:	Pounds per acre
Dallis grass	5
Italian ryegrass	5
Alfalfa	5
Ladino clover	6

This mixture, requiring a total of 21 pounds per acre, is seeded in the spring. Such a pasture is much less likely to cause bloating than alfalfa or Ladino clover alone; it provides a longer grazing season and a better balanced ration, makes better use of the irrigation water, and is less expensive to maintain. Harding grass, sweetclover, and orchard grass are sometimes added to this mixture, but the simpler one as given, is on the whole more satisfactory.

ROTATION GRAZING

The practice of rotation grazing consists in grazing two or more pastures in regular order with definite rest periods for the pastures. When only two pastures are involved this type of grazing is sometimes known as alternate grazing. Results from several experiments conducted in Maryland, Missouri, Virginia, and Washington on typical pastures of the better type, and in South Dakota on native range, were inconclusive in some cases, but in others the rotation plan increased the carrying capacity from 8 to 12 percent. They indicate that there is not usually justification in going to much expense to divide pastures that are already established especially when it is also necessary to provide shade and water in each division.

Another form of rotation is that of using several different kinds of pasture. This requires careful planning in order to have the animals on each pasture when they can get the most from it without reducing its productive capacity later on. An example is the use of rye in April, bluegrass in May and June, Sudan grass in July and August, lespedeza in September, and bluegrass in October and November. The choice of pasture crops will vary with different regions. On the western range, the rotation is important chiefly in connection with deferment of grazing on certain areas every 2 or 3 years in order that the desirable grasses may reseed and strengthen their root systems.

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[2] GARTHWAITE, E. L. A SURVEY OF MADERA COUNTY PASTURES. Pacific Rural Press 125:256. 1933.

CONTROL OF WEEDS AND BRUSH

The application of fertilizers is one of the best means of weed control, as generally grasses will dominate when they have favorable soil conditions. Mowing weeds at the proper time is another good means of control. In general, this is when the weeds are starting to bloom and before the seed has formed. It is necessary to mow twice during the year to eradicate some weeds.

Sheep and goats are very efficient in keeping down many troublesome weeds, and many farmers have found it profitable to keep a few sheep in their cattle pastures because of their tendency to eat weeds.

Woody shrubs, bushes, and young tree sprouts can best be controlled by being cut at the proper time. It has been shown by the Kansas Agricultural Experiment Station that buckbrush and sumac can be eradicated if cut while they are in flower, i.e., about May 10 and June 8, respectively. Work at the Connecticut Agricultural Experiment Station shows that July mowing of brush (soft maples, alders, white (gray) birches, blackberries, and others) is most successful for eradicating them from pastures. In the Northern States apparently the "critical period" for brush is when the roots contain the smallest amount of starch. On an average, this is at time of blooming.

The eradication of bushes, sprouts, and woody shrubs in the Southern States appears to be much more difficult than in the North. Grubbing them out or killing them with a plant poison has so far seemed the only sure way to eradicate them. Both these methods are expensive unless labor is very cheap.

Fertilizer treatment for growth promotion and improvement of stand

Element	Carrier	Rate per acre
Calcium	Ground limestone	1 ton.
Phosphorus	Superphosphate	300 to 500 pounds.
Potassium	Muriate or sulphate of potash	100 pounds.
Nitrogen	Nitrate of soda	100 to 200 pounds.
	or Sulphate of ammonia	75 to 150 pounds.
	or Barnyard manure	5 to 10 tons.

Average composition, in percentage, of pasture clippings at intervals throughout the growing seasons of 1929, 1931, and 1932 at the United States Dairy Experiment Station, Beltsville, Md.[1]

GREEN MATERIAL

Approximate date	Dry matter	Ash	Crude protein	Crude fiber	Starch and sugar (Nitrogen-free extract)	Fat (ether extract)	Calcium	Phosphorus
May 6	25.8	1.9	4.8	6.1	11.9	1.1	0.15	0.08
May 19	23.7	1.9	4.0	6.9	10.0	.9	.12	.11
June 2	26.8	2.2	4.8	7.2	11.5	1.1	.13	.11
June 28	28.8	2.6	5.0	7.7	12.2	1.3	.17	.13
July 14	30.5	2.8	5.7	8.1	12.4	1.5	.18	.16
Aug. 13	36.4	3.5	5.7	9.4	15.8	2.0	.25	.18
Aug. 30	43.5	3.5	7.1	11.8	18.7	2.4	.31	.17
Oct. 3	34.0	2.9	6.3	8.1	14.8	1.9	.23	.15

DRY MATERIAL

Approximate date	Dry matter	Ash	Crude protein	Crude fiber	Starch and sugar (Nitrogen-free extract)	Fat (ether extract)	Calcium	Phosphorus
May 6		7.4	18.6	23.7	46.3	4.0	0.58	0.33
May 19		7.9	17.0	29.2	42.1	3.8	.43	.39
June 2		8.3	17.9	27.0	42.7	4.1	.50	.40
June 28		9.1	17.2	26.7	42.5	4.5	.58	.44
July 14		9.3	18.6	26.4	40.9	4.8	.61	.52
Aug. 13		9.5	15.8	25.8	43.4	5.5	.69	.50
Aug. 30		8.0	16.4	27.0	43.0	5.6	.71	.39
Oct. 3		8.5	18.6	23.9	43.4	5.6	.67	.45

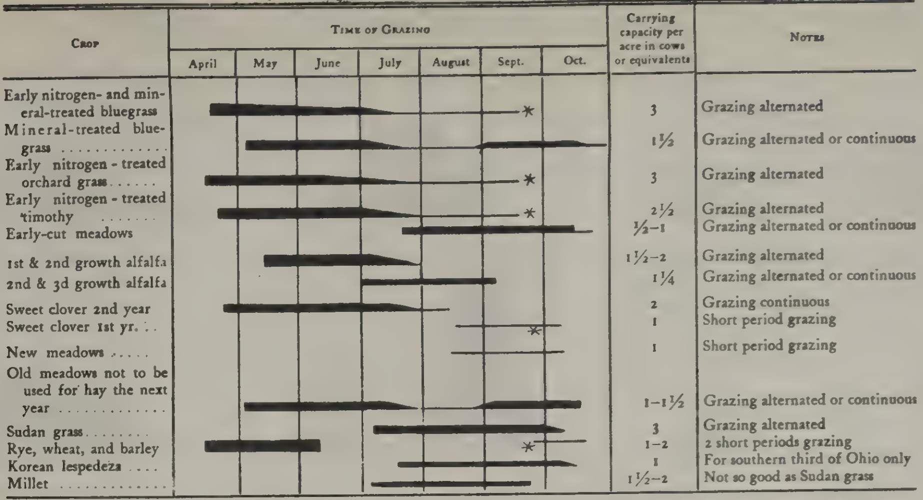
[1] This table is an average of the grass from 6 plots—1 in 1929, 2 in 1931, and 3 in 1932. The plots were located in good well-established pastures in which the predominating plants were Kentucky bluegrass, orchard grass, and white clover.

Analyses of typical immature grass (percentage), calculated at a 10-percent water content, and of some common dry feeds

Feed	Water	Ash	Crude protein (Nx6.25)	Crude fiber	Starch and sugar (nitrogen-free extract)	Fat (ether extract)
Pasturage:						
Bluegrass	10.0	8.0	15.9	23.1	39.1	3.9
Pasture mixture	10.0	10.2	16.1	16.9	44.0	2.8
Sudan grass	10.0	12.1	12.1	23.4	40.4	1.9
Sweet vernal	10.0	5.5	9.7	28.1	44.5	2.2
White clover	10.0	12.2	23.4	13.3	38.1	3.0
Cereals and cereal products:						
Corn (shelled)	12.9	1.3	9.3	1.9	70.2	4.3
Corn (corn-and-cob meal)	15.6	1.5	8.3	6.8	64.4	3.4
Oats	7.7	3.5	12.5	11.2	60.7	4.4
Wheat bran	9.6	5.9	16.2	8.5	55.6	4.2
Wheat middlings or shorts	10.1	3.5	16.3	4.3	61.6	4.2
Grass hays:						
Johnson grass	9.0	7.0	8.2	29.7	43.4	2.7
Sudan grass	5.3	8.1	9.7	27.9	47.3	1.7
Timothy	12.5	5.4	6.8	28.3	44.3	2.7
Legume hays:						
Alfalfa	8.3	8.9	16.0	27.1	37.1	2.6
Lespedeza	7.6	6.2	11.9	28.5	42.7	2.8
Red clover	12.9	6.9	13.6	24.1	39.1	3.4
Oil-mill products:						
Cottonseed meal (choice)	7.1	5.7	41.7	10.0	28.4	7.1
Linseed meal (old process)	8.9	5.4	34.5	7.7	36.7	6.8
Stover and straws:						
Corn stover	10.7	6.1	5.7	30.3	45.7	1.5
Oat straw	9.2	5.1	4.0	37.0	42.4	2.3
Wheat straw	9.6	4.2	3.4	38.1	43.4	1.3

CARRYING CAPACITY OF PASTURE CROPS

Pasture Crops with Time and Intensity of Production and Carrying Capacity



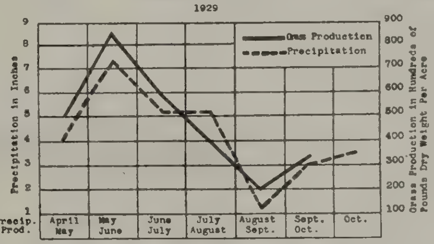
Crop	Carrying capacity per acre in cows or equivalents	Notes
Early nitrogen- and mineral-treated bluegrass	3	Grazing alternated
Mineral-treated bluegrass	1½	Grazing alternated or continuous
Early nitrogen-treated orchard grass	3	Grazing alternated
Early nitrogen-treated timothy	2½	Grazing alternated
Early-cut meadows	½–1	Grazing alternated or continuous
1st & 2nd growth alfalfa	1½–2	Grazing alternated
2nd & 3d growth alfalfa	1¼	Grazing alternated or continuous
Sweet clover 2nd year	2	Grazing continuous
Sweet clover 1st yr.	1	Short period grazing
New meadows	1	Short period grazing
Old meadows not to be used for hay the next year	1–1½	Grazing alternated or continuous
Sudan grass	3	Grazing alternated
Rye, wheat, and barley	1–2	2 short periods grazing
Korean lespedeza	1	For southern third of Ohio only
Millet	1½–2	Not so good as Sudan grass

* If these crops are not to be used for early spring pasture the following spring they may be used for heavier and later grazing in the fall.

▬ Heavy production ——— Light or doubtful production

The Natural Tendency of Plants as a Factor in Time of Production.—The tendency of bluegrass and second year sweet clover to produce early in the season has been mentioned. Sudan grass, soybeans, millet, and lespedeza, however, make heavy growth in July and August. First year sweet clover, new meadows, and August seeded rye make heavy growth in the late fall. Rye, orchard grass, timothy, and second year sweet clover are extra heavy growers in the spring of the year.

Effect of Precipitation on Time of Production.—Climate, of course, restricts certain plants to certain areas. Moisture is very commonly a disturbing factor.



Correlation between precipitation and grass growth as indicated by grass harvests the following month.

Effect of Soil Type on Time of Production.—The soil type frequently is a factor in the time of maximum pasture production. Upland soils dry out rapidly, and frequently are almost barren of green grass when lowland soils are producing good grazing. Productive soils suffer less from drouth, and it is a wise plan to devote such of them as may be needed to pasture.

Effect of Fertilization on Time of Production.—Nitrogen fertilizers tend, under favorable weather conditions, to produce their maximum effect soon after application. Extra early spring growth may be produced by a supply of available nitrogen at that time. Pasture plants may fail to respond with extra production to midsummer fertilization with nitrogen due to the limitation of moisture.

Under otherwise favorable growing conditions, nitrogenous fertilizer brings about large increases in the yield of vegetation but small increases in the percentage of protein. Under favorable growing conditions the reverse is true. Fertilizers on pasture areas are undoubtedly giving greater returns in meat and milk during dry seasons than is generally judged from the apparent growth. While it is possible to increase the production and protein content at certain times by providing available nitrogen and other nutrients, better results will be obtained if such fertilizer applications be made to plants that have a natural tendency to produce at the desired time.

Effect of Grazing on Time of Production.—The food with which pasture plants increase their top and root growth is manufactured in the blades or leaves. If blades or leaves are few and small, little food is manufactured and growth of top and root is slow. If all the top is removed new growth must come from food stored in the roots. If the new growth is at once removed, the food in storage is soon exhausted and the plant dies. A prolonged period of close grazing is always followed by a period of low production, while a period of light grazing will be followed by high production. Consequently, if early spring grazing is desired, the pasture plants must go into the winter with good root reserves with which to start vigorous spring growth. Continuous close grazing from early spring till midsummer results in plants of low vitality at that time. Due to weather conditions this is a very trying period for pasture plants, and they are likely to produce very little or even die during July or August.

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If midsummer pasture is desired, the plants should have a chance to build up reserves just prior to that period. The same holds true for all periods of the pasture season and for all of our common pasture plants.

Bluegrass and redtop, grazed to a height of 1½ to 5 inches, develop a thicker sod, and thus the extra blades compensate for the lack of extra length. Under such management continuous grazing may be practiced, with fairly uniform production so long as other conditions are favorable for growth.

The "Hohenheim" System of Rotational Grazing

The division of pastures into different fields, and the rotation of livestock from one area to another has been practiced in Europe and in parts of the eastern states in America for many years. In recent years there has developed in Europe a new but somewhat similar system of pasture management characterized by some foreign authorities as an outstanding improvement. This so-called "Hohenheim" system involves the following essential features:

1. The division of the pasture into a number of separate small fields or paddocks
2. The top-dressing of these paddocks in rotation during the growing season with a generous amount of readily available nitrogenous fertilizer, each paddock receiving several treatments during a single season.
3. The grazing of the paddocks in rotation, the period of grazing being so timed as to take advantage of the flush growth of succulent palatable grass following the fertilizer treatments.

The Hohenheim System of Pasture Management

Paddock 1	Paddock 2	Paddock 3	Paddock 4	Paddock 5
Being clipped, harrowed with flexible pasture harrow, and treated with nitrogenous fertilizer, following the removal of dry cows and young stock to Paddock 2	Being grazed by dry cows and young stock, following the removal of high production cows to Paddock 3	Fresh succulent grass, being grazed by high production cows. Cows to be shifted to Paddock 4 in eight to ten days and replaced by dry cows and young stock.	Fresh succulent grass to which high production cows will next be turned, followed by dry cows and young stock a few days later.	Fresh succulent grass just getting started, following a recent treatment as indicated in Paddock 1

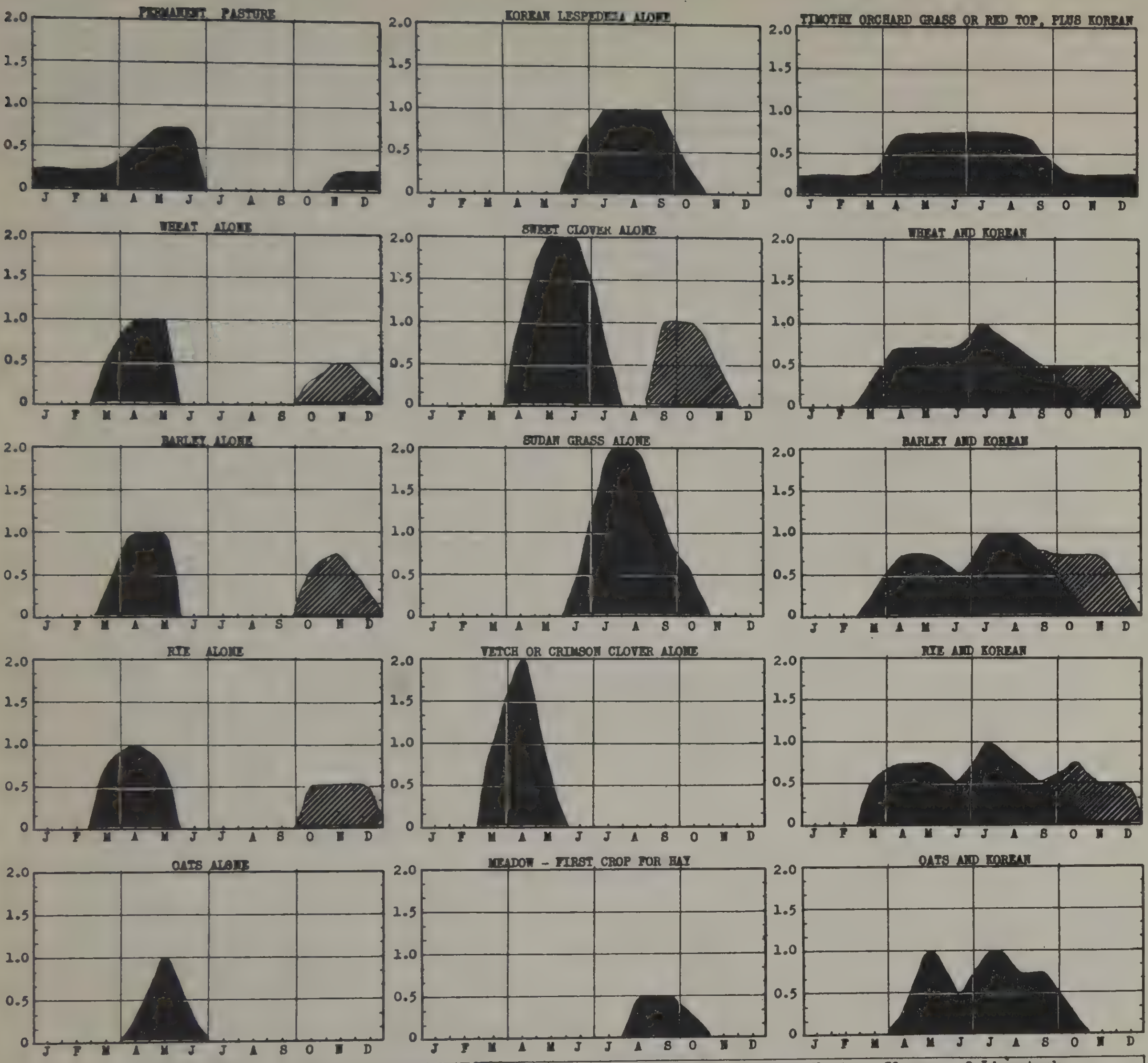
The Hohenheim system, illustrating the status of the various paddocks as they might appear about May 25, with the second rotation of stock in grazing.

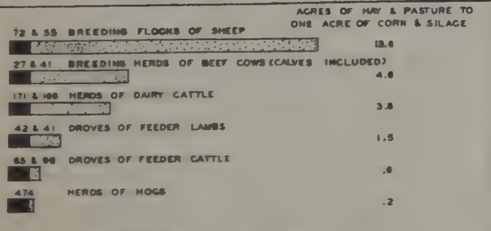
Under the Hohenheim system of rotational grazing it is customary to first graze for a period of a week to 10 days with milk cows or other kind of livestock requiring high protein feed, and to follow these with less exacting sorts such as dry cows, young stock, or sheep. If the area is not then evenly grazed, the remaining clumps of tall grass are mowed down and the area given a rest for about 20 to 25 days, that the new growth may reach a height of about 5 to 6 inches when the first class of livestock is again turned in. In the meanwhile the various classes of livestock are moved in order to other pastures. Thus the different classes of livestock are rotated from area to area during the season. With this system the use of the pasture harrow for distribution of droppings is frequently desirable at the beginning of rest periods.

It is claimed that rotational grazing provides a greater quantity of high quality herbage, that the pasture is more completely utilized, and that the pasture is kept freer of weeds.

While the rotational idea can be endorsed especially for dairy cattle and sheep, the repeated applications of nitrogen do not give the same response here as in Europe due to differences in climatic conditions. Probably not more than two nitrogen applications in March and June can be justified even in our most favorable seasons. Where pasture is limited and an intensive plan of production is desired the Hohenheim system with the modified nitrogen program is worthy of trial.

CARRYING CAPACITY OF PASTURE CROPS





Acres of Hay and Pasture Used With One Acre of Corn and Silage by Different Classes of Livestock

The averages are for two years; the first number is the number of records in 1938 and the second, the number in 1939 University of Illinois.

Units of Pasture Required by Various Classes of Livestock

	Unit		Unit
Mature Horses and Mules	1.00	Ewes, Yearlings, and Rams	.15
Yearlings and Two-Year Olds	.86	Spring Lambs	.04
Cows in Milk	1.00	Feeder Lambs	.12
Dry Cows and Bulls	1.10	Sows, Bred Gilts and Boars	.11
Yearling Heifers and Steers	.50	Spring Pigs	.04
Two-Year Old Heifers and Steers	.90	Fall Pigs	.025
Calves (Fall and Spring)	.25		

Carrying capacity is shown in terms of animal units (1 mature horse or cow) required to properly stock one acre of pasture. Although the above graphs are based on Central Missouri conditions and apply to land with a productivity capacity of 20 to 30 bushels of corn per acre, they have practical value to all interested in good pasture management. Poorer soils (less than 20-bushel land) will furnish 30 to 50 per cent less pasture than indicated above, and better soils (30 to 40-bushel land) should furnish 30 to 50 per cent more pasture than indicated. The lighter shading on the graphs above indicates that it is necessary to reseed the crop to secure the fall pasture.

The amount of permanent pasture secured during winter months will depend chiefly on how heavily the pasture is grazed in the fall. Lespedeza and sudan grass stand out in striking contrast to our other common pasture plants because they make their best growth in the dry hot period of mid-summer while most others make their best growth in the spring and fall. The possible results of combining these crops with others to extend the pasture season from spring to fall is illustrated in the graphs on the right side of this page. Alone,no single crop even approaches this ideal but in combination the results are very satisfactory. Lespedeza and small grain are usually combined in the same rotation, but at least two fields are necessary to make maximum use of all plant growth. Sweet clover and sudan grass cannot be satisfactorily used in the same rotation. Refer again to the Missouri all-year pasture plan briefly outlined at the bottom of Digest page 540.

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GRASSES FOR PERMANENT PASTURES

Name	Climatic adaptation [1]	Degree of palatability	Season for grazing	Time and rate of seeding per acre	Soil adaptation	Remarks
Bahia grass (*Paspalum notatum*).	Section 2-b	High	Early spring to late fall.	Early spring, 10 to 15 pounds	Sandy loam to sand.	Seed expensive and of low germination.
Bermuda grass (*Cynodon dactylon*).	Region 2 and sections 3-b and 4-b.	Medium	Late spring to early fall.	Early spring, 5 to 8 pounds	Loams, clays, and silts.	Propagated to a large extent vegetatively.
Bromegrass or smooth brome (*Bromus inermis*).	Western part of section 1-a and sections 3-a and 4-a.	High	Very early spring to late fall.	Early spring or early fall, 15 to 20 pounds.	Practically any type.	Becomes sod-bound quickly.
Canada bluegrass (*Poa compressa*).	Region 1-a and sections 3-a and 4-a.	do	Early spring to late fall.	Early spring or fall, 15 to 20 pounds.	Almost any type	Succeeds on poor soils.
Carpet grass (*Axonopus compressus*).	Region 2	Medium	Spring to fall	Early spring, 8 to 12 pounds	Moist sands or sandy loam.	Makes a very tight turf.
Centipede grass (*Eremochloa ophiuroides*).	Southern half of region 2	do	do	Early spring; use sod or stolons; no seed available.	Almost any type	Makes a close turf and is very aggressive, when once established, crowding out weeds, legumes, and other grasses.
Crested wheatgrass (*Agropyron cristatum*).	Sections 3-a and 4-a	High	Very early spring to late fall.	Early spring, 12 to 15 pounds	do	Drought resistant; easy to get a stand.
Dallis grass (*Paspalum dilatatum*).	Region 2 and sections 3-b, 4-b, and 5-b where irrigated.	do	Early spring to late fall.	Early spring or fall, 8 to 12 pounds.	Any fairly productive soil.	Seed expensive and often of low germination; difficult to get a stand.
Johnson grass (*Sorghum halepense*).	Region 2 and section 3-b; also 4-b and 5-b where irrigated.	do	Spring to fall	Early spring, 20 to 25 pounds	Loams and clays	Productiveness decreases rapidly when grazed; very difficult to eradicate.
Kentucky bluegrass (*Poa pratensis*).	Region 1 and section 5-a; also 3-a and 4-a where moisture is plentiful.	do	Spring to late fall	Early fall, 15 to 20 pounds	Sandy loams to clays of high productivity.	The leading pasture grass on good soils in the North.
Meadow fescue (*Festuca elatior*).	Region 1 and section 5-a; also 3-a and 4-a where moisture is plentiful.	do	Early spring to late fall.	Early fall, 20 to 25 pounds	Loams to heavy clays.	Valuable in section 5-a; of limited value elsewhere, disappearing rather quickly except on heavy, moist clays.
Meadow foxtail (*Alopecurus pratensis*).	Sections 1-a and 5-a; also 4-a at high altitudes.	do	do	do	Moist sandy loams to clay.	Very useful in pasture mixtures on wet soils, especially in 5-a.
Orchard grass (*Dactylis glomerata*).	Region 1; also sections 3-a, 4-a, and 5-a where moisture is plentiful.	Medium to high.	Early spring to fall.	Early fall or early spring, 20 to 25 pounds.	Any soil type except sand, if not too wet.	Inclined to grow in bunches unless seeded thickly.
Para grass (*Panicum purpurascens*).	Section 2-b	High	Spring to fall	Early spring, no seed available	Wet soils	Propagated by planting pieces of stem or sod.
Perennial ryegrass (*Lolium perenne*).	Southern half of region 1 and in section 5-a.	do	Early spring to late fall; winter grazing in section 2-a to limited extent.	Very early fall (or spring in the North), 20 to 25 pounds.	Sandy loams to clays of medium to good fertility.	Used but little in pasture except in section 5-a.
Redtop (*Agrostis alba*)	Regions 1, 2, and section 5-a; also under irrigation and in mountain meadows, sections 3-a and 4-a.	Medium	Early spring to late fall.	Early fall best, early spring fair, 10 to 12 pounds.	Grows on majority of soil types; prefers moist soils.	Of most value on poorly drained soils too wet for other grasses.
Reed canary grass (*Phalaris arundinacea*).	Sections 1-a and 5-a; also 3-a and 4-a where moisture is plentiful.	do	Spring to fall	Very early spring. 8 to 12 pounds	Loams to heavy clays.	Very good for wet lands, will endure submergence.
Rescue grass (*Bromus catharticus*).	Region 2, and where moisture is sufficient in sections 3-b and 4-b.	do	Fall to spring (winter pasture)	Early fall, 20 to 25 pounds	Sandy loam to clay loam.	An annual, used in some localities for winter and spring grazing.
Rhodes grass (*Chloris gayana*).	Section 2-b; also southern parts of 3-b and 4-b.	do	Spring to fall	Spring. 10 to 12 pounds	Loams to clays	Found most useful in the dry sections of southern Texas where other grasses fail.
Slender wheatgrass (*Agropyron pauciflorum*).	Northern parts of sections 3-a and 4-a.	High	Early spring to late fall.	Early spring, 15 pounds	Practically any type, except sand.	Better for hay than pasture; inclined to be stemmy.
Tall oatgrass (*Arrhenatherum elatius*).	Sections 1-b and 5-a	Medium	do	Early fall, 20 to 25 pounds	do	Better in hay mixtures than for pasture; stemmy; used most for pasture in section 5-a.
Timothy (*Phleum pratense*).	Region 1 and section 5-a; also 3-a and 4-a where moisture is sufficient.	High	do	Early fall (or early spring), 12 to 15 pounds.	do	Comes quickly and furnishes much pasturage at first, but is not permanent.

LEGUMES FOR PERMANENT PASTURES

Name	Climatic adaptation [1]	Degree of palatability	Season for grazing	Time and rate of seeding per acre	Soil adaptation	Remarks
Alfalfa (*Medicago sativa*)	All regions where moisture is sufficient, but only locally in region 2.	Very high	Spring to early fall. Winter grazing in Southwest when irrigated.	Depends on location; consult State experiment station.	Practically any fertile soil not wet or acid.	Good pasture, but danger of bloat. Use locally adapted seed.
Alsike clover (*Trifolium hybridum*).	Chiefly region 1 and section 5-a. In sections 3-a and 4-a if moisture is sufficient. Winter crop in region 2.	do	Early spring and fall.	Early spring, 8 to 10 pounds.	Practically any soil type except sands. Will stand slight acidity also will tolerate some inadequate drainage.	Especially suited for wet land.
Red clover (*Trifolium pratense*).	do	do	Early spring to fall	Early spring, 10 to 15 pounds.	Practically any well-drained soil if not acid.	Use locally adapted seed.
Mammoth red clover (*Trifolium pratense* var.).	Region 1, chiefly section 1-a	High	do	Early spring, 10 to 12 pounds.	Practically any well-drained soil not more than slightly acid.	Will endure slightly more soil acidity than common red.
White clover (*Trifolium repens*).	All regions where moisture is sufficient.	Very high	Early spring and fall.	Very early spring, 5 to 10 pounds.	Practically any soil type.	Everywhere in the North. In region 2, winter and spring crop.
Ladino clover (*Trifolium repens* var.).	Sections 4-a, 5-a, and 5-b	do	Spring to fall	Early spring, 5 to 10 pounds.	Practically any well-drained, well-watered soil.	Injured by heavy continuous grazing.
Least hop clover (*Trifolium dubium*).	Sections 2-a and 5-a and parts of section 1-b.	High	Spring	Late summer, 4 to 5 pounds.	Good soil	Annual; disappears in June; volunteers.
Low hop clover (*Trifolium procumbens*).	Section 2-a and southern part of section 1-b.	do	do	do	Practically any well-drained soil.	Annual; usually disappears in June but volunteers.
Strawberry clover (*Trifolium fragiferum*).	Locally in sections 3-a, 4-a, and 5-a.	do	Spring to fall	Early spring, 5 to 10 pounds.	Wet alkali soil	Grown only locally; domestic seed produced in Oregon
Sour clover or annual melilot (*Melilotus indica*).	Region 2 and sections 3-b, 4-b, and 5-b.	Medium	Winter and early spring.	Late summer	Sweet well-drained soils.	Annual; volunteers; no value north of region 2.
Yellow trefoil or black medic (*Medicago lupulina*).	Region 2 and section 1-b	Very high.	Early spring to late fall.	Very early spring, 8 to 12 pounds.	do	Not prominent, except on black land in Alabama and Mississippi.
California bur-clover (*Medicago hispida*).	Sections 3-b, 4-b, and 5-b, if sufficient moisture, also eastern Texas and Oklahoma.	High	Fall to spring	Late summer, 15 to 20 pounds hulled seed.	Well-drained soil of practically any type.	A winter annual; volunteers.
Southern bur-clover (*Medicago arabica*).	Region 2 and section 3-b	do	do	Late summer, 10 to 15 pounds hulled seed.	Well-drained soil	Annual, but reseeds.
Common lespedeza (*Lespedeza striata*).[3]	Region 2 and section 1-b	do	Early summer to fall.	Early spring, 20 to 25 pounds.	do	Annual, but is usually permanent in pastures because of volunteer seeding.
Korean lespedeza (*Lespedeza stipulacea*).	Section 1-b	do	do	do	Practically any well-drained soil.	Annual, but volunteers.

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[1] Region and section numbers refer to map on page 178.

[3] Kobe and Tennessee 76 are heavy-yielding strains of common lespedeza which should be used in region 2 and the southern part of section 1-b.

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PLANTS USEFUL FOR SUPPLEMENTAL PASTURES

Name	Climatic adaptation [1]	Degree of palatability	Season for grazing	Time and rate of seeding per acre	Soil adaptation	Remarks
Barley	Wherever enough moisture is available.	High	Spring in North, fall and spring in South.	Fall in South; spring in North; 1 to 2 bushels.	Well-drained soils of moderate fertility.	Use seed of a locally successful variety.
Cowpeas (*Vigna sinensis*).	Region 2 and section 1–b	do	Late summer and fall	Spring to early summer; 30 pounds in rows, 15 pounds alternate rows in corn.	Almost any well-drained soil.	When intended for grazing, usually planted with corn and grazed when seed matures.
Crimson clover (*Trifolium incarnatum*).	Mainly sections 5–a and 2–a, and the southern and eastern part of section 1–b.	do	Fall to spring	Late summer; 12 to 15 pounds.	Well-drained fertile	Prefers fertile sandy loams; best used in mixture with rye.
Italian ryegrass (*Lolium multiflorum*).	Regions 1 and 2, and section 5–a.	do	Early fall to midsummer.	Early fall or very early spring in North, 20 to 25 pounds.	Sandy loams to clays of medium to good fertility.	Probably the best grass for late-fall and early-spring grazing.
Kudzu (*Pueraria thunbergiana*).	Region 2 and favorable locations in the southern part of section 1–b.	Medium	Spring to fall	Early spring rooted plants are set 6 to 8 feet apart; seed is available.	Practically any well-drained soil.	Difficult to establish from seed; plants should be set before spring growth begins; can readily be overgrazed.
Napier grass (*Pennisetum purpureum*).	Region 2, southern part of sections 3–b, 4–b, and 5–b if irrigated.	High	Late spring to fall	Early spring; no seed available.	Sandy loams to clays	Propagated by seed canes, like sugarcane.
Oats	Wherever enough moisture is available.	do	Spring in North; fall and winter and spring in South.	Fall in South, spring in North; 2 to 3 bushels.	Well-drained soils of moderate fertility.	Use seed of a locally successful variety.
Rape (*Brassica napus*).	Sections 1–a, 1–b, and 5–a, locally 3–a and 4–a, winter crop in region 2.	do	Early summer, late fall. and winter according to the climate.	Early spring, later if desired; early fall in South; in rows 3 pounds, broadcast 8 pounds.	Prefers rich, good, moist, loamy soil.	Especially good for sheep and hogs. Some danger of bloating in sheep.
Soybeans (*Soja max*).	Regions 1 and 2 except northern part of section 1–a.	Very high	Midsummer to fall	Spring to early summer; 42-inch rows 30 pounds, 30-inch rows 45 pounds.	Practically any well-drained soil.	Varieties differ in respect to their ability to renew growth after defoliation.
Sudan grass (*Sorghum vulgare* var. *sudanense*).	All regions except extreme north.	High	Early summer until frost.	Middle spring to early summer; 15 to 25 pounds.	do	One of the most productive and palatable of all annual pasture grasses for summer grazing.
Sweetclover (*Melilotus alba* and *M. officinalis*).	Regions 1, 2, and 3; also section 4–a where moisture is sufficient.	Medium	Very early spring (second year) to late fall (first year).	Winter and very early spring; 15 to 20 pounds.	Any well-drained nonacid soil.	Provides much nutritious pasture, but its success often requires applications of lime.
Velvetbeans [2]	Section 2–b and southern part of 2–a.	High	Fall and winter	Spring, with corn	Any well-drained soil	Usually grazed after the corn has been harvested.
Vetch [3]	Regions 1 and 2; also region 5 where moisture is available.	High	Early spring; some fall and winter in South.	Early fall; 30 to 50 pounds, depending on size of seed.	Well-drained soils of fair fertility.	Several species. Use locally adapted kinds.
Wheat and rye	Wherever enough moisture is available.	Wheat high; rye medium to high.	Fall and spring	Early fall; 1 to 2 bushels	Well-drained soils of moderate fertility.	Use seed of a locally successful variety.
Winter peas [3]	Regions 2 and 5 where moisture is available.	Very high	Early spring; some fall and winter in South.	Early fall; 30 to 50 pounds	Well-drained soils of fair fertility.	Sometimes suffer from disease; often injured by trampling.

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[1] Region and Section Numbers Refer to Map on Page 175

[2] Usually seeded with corn.

[3] Best for grazing when seeded with small grain

SUPPLEMENTAL PASTURES

While the hardy perennial grasses and legumes have a value that cannot be denied for seeding pastures to provide a turf that will keep animals out of the mud and require but little attention after it is once established, their inclination to be unproductive when it is too hot or too cold makes it desirable to grow annual or biennial crops suitable for grazing. Such crops as rye, wheat, barley, oats, Sudan grass, rape, ryegrass, sweetclover, or soybeans are recommended because they have 2 to 4 times the carrying capacity in early spring, midsummer, and late fall of the average permanent pasture on soils of equal productivity. Larger yields, together with the advantage of having pasturage to replace barn feeds when permanent pastures are unproductive, offset the expense of preparing the ground and seeding such crops each season.

For a temporary pasture it is important to have level or nearly level land and a soil that will not erode badly, as the plowing and seeding require that the ground be bare for short periods each year.

Comparison of the quantities of digestible nutrients produced from harvested crops and pasturage at the yields indicated

Crop	Yields per acre of —		Total digestible nutrients [1] when —	
	Concentrates	Roughage	Harvested	Grazed
	Bushels	*Tons*	*Pounds*	*Pounds*
Cereals:				
Corn ears	28.2		1,396	
Corn stover		0.84	852	
Corn, whole plant as silage		5.60	2,273	
Barley	22.8	.82	1,522	
Oats	29.6	.88	1,359	
Wheat	14.1	.63	1,092	
Forage plants:				
Alfalfa		2.61	2,793	2,067
Clover, red, alsike, and crimson		1.46	1,504	1,113
Sweetclover		1.82	1,867	1,382
Lespedeza		1.82	1,170	866
Clover and timothy mixed		1.40	1,393	1,030
Timothy		1.26	1,210	895
Grains cut green		1.31	1,292	956
Annual legumes [2]		1.02	1,102	815
Millet, Johnson grass, and Sudan grass		1.23	1,225	906

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[1] Based on analyses of feeds and their coefficients of digestibility for crude protein, fiber, fat (ether extract), starch and sugar (nitrogen-free extract), compiled by G. L. Bidwell and A. T. Semple of the U.S. Department of Agriculture.

[2] Principally cowpeas and soybeans.

U. S. DEPT. OF AGRICULTURE

FIRST IN A SERIES ON
GRASSLAND FARMING

HIGH PRESSURE PASTURES

MIDWEST STYLE

Grassland Farming has become a nation-wide movement backed by USDA and many agricultural colleges. It is not an effort to seed down all our farms with legumes and grasses. But it is an attempt to make the most intelligent use of a billion acres of land best suited for permanent pasture.

☞The objectives of grassland farming are:

- Increased production of livestock and livestock products.
- Increased yield of crops per acre.
- Building up reserves of food on the hoof.
- Control of soil erosion.
- Building up soil fertility.

No single feed can be given to livestock that is as complete in its nutritive qualities as a modern pasture, says Carl B. Bender, pasture research specialist at Rutgers University, New Jersey. It contains all the essentials in the form of protein, carbohydrates, fats, mineral, vitamins. It has 19 of the 21 essential amino acids.

For dairy cattle, the value of pasture grass has not been challenged economically or nutritionally by any other form of feed -- Cornell University. A cow producing 12,000 pounds of milk will produce 80 per cent of her capacity on high grade roughage alone.

For growing and fattening hogs, a good pasture crop will save 5 to 10 per cent of the grain and 30 to 40 per cent of the protein supplement needed. A vast saving in hog feeding could be made by a wider use of superior pasture crops. -- Purdue University.

For beef cattle, good pastures will produce 250 to 400 pounds of beef per acre, -- worth as much as 50-80 bushels of corn at $1.50 per bushel. Lambs can be fattened for market on pasture without grain feeding.

Soil Fertility need not be a limiting factor in pasture production. But you must build up the fertility level and maintain it with annual applications of plant food.

Test the soil and make needed treatments. See your county agent, high school vo-ag instructor or state agricultural college. Acidity, phosphate, and potash tests should be made. In Missouri a magnesium test has been developed. All tests should be made, just one or two isn't enough. Take at least 10 samples from each 40 acre field.

A sweet soil is necessary to grow abundant crops of ladino, alfalfa, sweet clover and most other legumes. Finely ground limestone is the best way to neutralize acidity and supply calcium. When calcium and magnesium are both needed, use dolomitic limestone.

Phosphate is supplied as ground rock phosphate, superphosphate, or treble phosphate. Rock phosphate is the cheapest source of phosphorus but it becomes available slowly. A single application of 1000 - 1200 pounds per acre will last 8 to 10 years. Superphosphate (0-20-0) applied at a rate of 250 pounds per acre is preferred by some. It becomes available more readily but is used up in a year or two. Potash is most easily applied as muriate of potash.

After the level of fertility is reached the annual maintenance needs must be supplied with 200-300 pounds mixed fertilizers or 4-5 tons manure. To give new seedings a boost, use mixed fertilizers including nitrogen.

Most nitrogen in pastures will be supplied by establishing legumes which will supply their own nitrogen from the air. Select deep rooted legumes which draw nutrients from deep in the soil. Alfalfa and sweet clover are two of the best. Ladino clover is long-lived and a good producer but is shallow-rooted. Use of lespedeza is limited to the southern areas of the Corn Belt. Birdsfoot trefoil is deep rooted and drouth resistant, and maintains itself well. But, it is slow to establish and will heave in claypan soils.

☞Prepare a good seedbed. To prevent erosion, farm on the contour. Leave all possible protection in waterways. (See page 663)

☞Use good seed of adapted varieties. From 15 to 25 pounds of grass and legume seed will be needed to get good stands.

For general farming areas between the Corn and Cotton Belts, our southeast Missouri farm managers follow this plan: Plow land in July, work down and seed in late August:

Ladino clover $\frac{1}{2}$ - 2#
Ky. 31 Fescue 8 - 10# ,
Red Top 3#
Timothy 5#
Lespedeza 10 - 15# (In spring)

Top dress with 300# ammonium nitrate or equivalent 100# nitrogen per acre. Apply $\frac{1}{2}$ fertilizer about Feb. 20; other $\frac{1}{2}$ month later.

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MORE MEAT FROM BETTER PASTURES

Here are some recommended mixtures for Corn Belt pastures:

Long Rotation Mixtures(2-3 yrs)

Alfalfa	8 lbs.
Brome grass	6 lbs.
Timothy	3 lbs.
Ladino (optional)	1 lb.

Short Rotation Mixture (1 yr.)

Red clover	4-6 lbs.
Alsike clover	2 lbs.
Timothy	4-6 lbs.

Pasture Only

Alfalfa	4 lbs.
Sweet clover	4 lbs.
Alsike clover	2 lbs.
Brome grass	6 lbs.
Timothy	3 lbs.

Low, Wet Land

Reed canary grass	6 lbs.
Brome grass	4 lbs.
Ladino clover	1 lb.

Well Drained Land -- Pasture 1st Yr.

Alfalfa	8 lbs.
Brome grass	6 lbs.
Timothy	2 lbs.

(Timothy lessens danger of bloat the 1st. year)

Well-Drained Land -- Pasture After 1st Year

Alfalfa	8 lbs.
Brome grass	8 lbs.

A 12 Month Hog Pasture using only 2 crops has been worked out by Purdue University. From May to October the hogs are on ladino clover. One acre will furnish pasture for 20 fattening hogs. The ladino is seeded 1# per acre with small grain. On drouthy land, 8# alfalfa and ½ # of ladino are used. For fertilizer, use 400# of 3-12-12.

From November through April, the hogs are pastured on Balbo rye. It is sown at a rate of 6 pecks per acre in late August or early September. They apply 300# of 8-8-8 or 3-12-12. Rye will furnish pasture 5-6 weeks after it is sown, -- will provide pasture on open winter days and early spring.

☞Choose a suitable time to seed. In the southern half of the Corn Belt, legumes and grass can be seeded in early fall. In northern areas February and March are the best time. Lespedeza is always sown in the spring. For details of adapted grass and legume pasture crops see pages 175-177.

☞Cover seed lightly. From 1/4 to 1/2 inch is enough. When sown on top of frozen ground, freezing and thawing will work the seed in.

☞Get stand well-established before turning stock into graze. Plants should be 6 to 8 inches high. Limit the amount of grazing the first year on a permanent pasture. Mow early weeds in June, late weeds in August -- set the cutter bar at least 6 inches above the ground.

☞Use pasture when it is most palatable. No pasture is equally desirable at all times. With good planning the grazing season can be extended by planning a sequence of pasture crops that reach their peak growth from early spring to late fall. Grasses are usually best in spring and fall -- legumes in the summer.

In northern areas where snow covers the ground, 6 - 7 months of pasture may be the best to expect. High quality hay must supply roughfeed the remainder of the year.

Does It Pay to raise any pasture on Corn Belt soils that will produce 100 bushel corn? A seven year study in 14 counties of northern Illinois shows that it does. On the better level Corn Belt soils it was found that keeping 25 per cent of the crop land in legume-grass mixtures produced:

- The largest net farm earnings.
- The highest rate of return on investment.
- Higher crop yields.
- Almost the same total grain production on fewer acres.
- More total digestible nutrients per acre.

On medium soils with some erosion hazard, it remained "quite profitable" to keep up to 1/3 or 2/5 in pasture.

On rolling land and, old worn-out soils subject to serious erosion, the work at the Dixon Springs Experiment station in southern Illinois has brought this conclusion: "Grass farming is a practical way of combining erosion control and production. There is reason to believe that it will bring larger finiancial returns than any other system of farming that can be widely used on this kind of land."

The Facts Of Life must not be overlooked in planning a grassland pasture program. Land suitable for a grassland program can be purchased for $35 - $100 per acre in any Corn Belt state. But this is only the beginning. The cost of improving this land to grow good pasture is $30 to $60 per acre. Annual maintenance costs will run from $5 - $15 per acre. Some land is so rocky and steep that it cannot be forced to produce good pasture.

To use good pasture requires heavy investments in livestock. One cow per acre amounts to $200 - $250 at present prices. Add to this cost of fences, buildings, equipment, at $15 to $50 per acre. In addition there is the high labor cost to repair fences, and mow pastures and put up hay.

Rich, lush pastures are relished by cattle, but the danger of bloat is always present. Poison plants can also bring losses. The loss of one steer will wipe out the profit from 3 to 4 others.

☞A superior operator is required to handle livestock successfully. Absentee landlords should think twice before investing in a grassland farming operation that must depend on hired help. Many farm operators will do well to examine their liking for and ability to handle livestock before jumping overboard on a grassland farming program.

BETTER LIVESTOCK PASTURES

Improvement of General Pasture Area

Treatment of Permanent Pastures.—Where lime is needed, it is the proper starting point in the improvement of permanent pasture areas. The amount needed should be determined by testing the soil. The application may be made directly to the soil surface at any convenient time. This is usually in the summer or fall. On steep land or where the vegetation is thin, grooving with a disk harrow will permit better incorporation of the lime in the soil. Ordinarily, however, applications without incorporation will suffice. The application should be repeated when needed as determined by the type of vegetation and further soil tests. Generally this will be about every six or eight years.

The next step is the application of 300 to 500 pounds of 20 per cent superphosphate or 0-14-6 fertilizer per acre. The time of application is relatively unimportant. Quickest results may be expected from an application very early in the spring, but this frequently is not the most convenient time, and any time when the land is in satisfactory condition between October 1 and April 1 is satisfactory. . . .

This application should be repeated about every 4 or 5 years. Equivalent amounts of higher analysis fertilizers are equally satisfactory.

Little will ever be accomplished in the improvement of permanent pasture unless treatment becomes a regular farm practice. It is urged that each year when fertilizer and lime are being purchased for crop land that provision be made for some pasture land. One-fifth or one-sixth of the entire area is suggested.

Reseeding Permanent Pasture.—Reseeding generally will not be necessary, since the content of desirable grass and clover will rapidly increase following treatment. However, where rapid improvement is desired or where the content of desirable grass and clover is below 5 per cent, reseeding with about 5 to 10 pounds per acre of the following seed mixture is advisable: 7 pounds Kentucky bluegrass, 4 pounds timothy or orchard grass, 3 pounds redtop, 3 pounds alsike clover, and 1 pound white clover. Since early fall seeding of grasses through a drill in late September or early October frequently gives best results, the grasses may be seeded at that time and the legumes in the early spring, or all may be broadcast at one time in the spring. Close grazing just prior to or following reseeding and a light disturbance of the soil at seeding time, especially in the fall, further increase the chances of success. . . .

Two pounds of Korean and 2 pounds of Japanese lespedeza may be added to the seed mixture or used separately. These supply additional mid-season grazing. The seeding may be made very early in the spring on the old inferior pasture sod after it has been limed and fertilized without any other preparation of the soil. . . .

Sometimes the mat of poverty grass is so heavy that fertilizer cannot be incorporated nor can the new seeding make a start. Occasionally, too, weeds are so much of a problem that it seems more desirable to make a fresh start. Where such a condition exists and where erosion is not a serious problem, the area should be plowed or disked and re-established.

Grazing and Care of Permanent Pastures

The Ideal Condition.—The ideal condition for the most nutritious herbage, the best balance of nutrients and maximum growth of permanent pasture, is a white clover or other legume content of 25 to 45 per cent and a grass content of 75 to 55 per cent, with herbage 1½ to 5 or 6 inches in height. . . .

White clover, yellow trefoil, hop clover, and the lespedezas will be crowded out if the grass becomes too large, as sometimes results, especially following applications of nitrogenous fertilizers. These legumes in the territories in which they are adapted gather nitrogen from the air and produce a better growth of grass. Their presence also enriches the protein and mineral content of the herbage. If, under otherwise favorable conditions for clover, the area is continuously grazed shorter than 1½ inches, the grass suffers more than the clover and will be predominately a white clover pasture, which is higher than needed in protein and rather low in yield per acre.

Methods of Grazing.—In order to provide the ideal conditions which give the desirable percentages of legumes and grass, alternate or rotational grazing is desirable. When the herbage has attained a height of 4 to 5 inches it may be grazed off quickly to 1½ to 2 inches, and the stock then moved to another area to give the first a chance to recuperate. Electric fence provides a low cost means of dividing large pastures. If patches remain ungrazed these should be mowed so as to encourage the development of a new, more palatable growth and prevent the smothering of the clovers.

Where continuous grazing is necessary, the mower should be used in the same manner, and care should be taken not to overgraze. Whenever the livestock keep the area uniformly grazed to a height of less than 1½ inches for more than a few days, the pasture is being injured, recovery will be slow, and yields low for some time. Overgrazing for a period of several weeks early in the season may reduce production the following year by one-half or more. On some farms the livestock remain on the pasture all winter. This reduces the productivity of the pasture, since the grazing of the meager growth in the late fall, winter, and early spring gradually reduces the root reserves, and leaves the plants without sufficient strength to make a good start in the spring.

Effect of Close Grazing.—Grazing may be started in the spring as soon as a growth of 4 to 5 inches has developed. The date at which this occurs varies widely with the productivity level of the soil and the previous management.

Usually for the main pasture area it will be near the end of the corn planting period, but growth rather than date should be the determining factor. If the spring is cool the growth will be slow and soon consumed. In such event it must then be protected till further growth develops. It is not the early grazing but the continuous close grazing that is so injurious. By special care and treatment extra early pasture can be produced, and this is discussed later under early spring pasture.

Grazing Different Kinds of Livestock.—Different kinds of livestock have different habits of grazing and they show preference for different types of plants and graze to different heights. A pasture grazed by both cattle and sheep at the same time or in succession is generally freer from weeds, requires less mowing, and is more productive. The total returns in livestock and livestock products are greater than where grazed only by one class of livestock.

Many cases in which farmers have failed to get the response they expected from fertilizers and liming materials on permanent pastures can be accounted for by overgrazing, particularly in the early spring, July and August, and the late fall, or undergrazing in May and June and failure to mow the pasture.

Harrowing Permanent Pastures.—Productive pastures frequently become thickly spotted with heavy clumps of grass about numerous dung piles where livestock refuse to graze. Not only is this grass wasted but no grass grows on the area of the dung heap for one or two years. These droppings may be turned from a liability to an asset if they are scattered evenly over the area by harrowing. Where alternate or rotational grazing is practiced, this operation may follow the removal of the livestock. The manure thus evenly distributed is soon washed into the sod and increases the new growth uniformly over the entire area.

Except for the scattering of the manure, and the incorporation of phosphate and potash fertilizers and sometimes lime, there appears to be no particular advantage in harrowing, disking, or otherwise cultivating permanent pastures.

Sweet Clover for Runout Areas in Permanent Pasture.—There are areas too badly eroded or runout for the satisfactory growth of alfalfa or common pasture plants (even when lime and fertilizer are used). Often the owner of the farm wishes to improve such land for future use, and is willing to spare it from regular grazing for several years while such improvement is taking place. Sweet clover is probably the best crop for improving such land, but little income can be secured for 5 or 6 years. Good stands of sweet clover may not be obtained from one seeding, and partial reseeding may be necessary.

Apply the necessary liming materials after disking lightly so that some of the liming material may work into the grooves. Seed 10 to 12 pounds per acre of inoculated scarified seed March 15 to April 1, or 30 pounds of seed in the hull the previous fall. Where a good sweet clover stand was not obtained at first, reseed the following spring or fall. On unproductive areas a light mulch of manure, old hay, straw, or chaff applied in the fall or winter will be very helpful, and may even be necessary to a catch.

In addition to the lime already mentioned, an application of 200 to 300 pounds per acre of 20 per cent superphosphate or 0-14-6 should be made when the sweet clover is seeded.

In no case, under such depleted soil conditions, should there be enough grazing to prevent seed production. With light grazing and proper protection, bluegrass will come in the field in a few years, and with ordinary grazing the sweet clover will gradually disappear. . . .

Meadows as Pastures.—Where grass meadows are to be maintained a second and third year for pasture, the fertilizer application at the time of establishing them should not be less than 350 pounds per acre. If less was used, an additional application of 200 to 300 pounds of 20 per cent superphosphate or 0-14-6 may be used in the fall, winter, or early spring before the second or third season, as indicated at top of page 18. Should heavier production of the permanent or meadow pasture be desired, annual applications of 200 to 300 pounds of sulfate of ammonia, or equivalent amounts of other quickly available nitrogen carriers may be made in March.

Manure on Pasture Land.—There are several reasons why manure is not extensively used on permanent pasture fields. It is objected to by the grazing livestock, and, when not properly applied or under poor conditions of management, it appears to encourage development of the larger type of pasture field weeds. However, where it is available, it may be an effective means of pasture improvement. Each ton should be supplemented with 30 to 40 pounds of 20 per cent superphosphate or its equivalent. This combination may be used in place of the other fertilizers mentioned on either the permanent or meadow type pastures, and it provides a convenient place to haul manure during the summer when it cannot be taken to crop land. The usual rate is 6 tons per acre. On permanent pastures this may be repeated every three or four years.

The practice has much to commend it to the dairy farmer under present economic conditions and where intelligently used is a very desirable practice. If only one-third or one-fourth of the pasture is covered each year the livestock will have the other area on which to graze and the manured area will come on later in the year or the following year, depending upon the time of application, with vigorous production. The manure helps by both protecting from grazing for a time and providing extra nutrients, and probably also increasing the moisture holding capacity of the soil.

The uneven growth and high weed content resulting from manure can, to considerable degree, be controlled by grazing with both cattle and sheep, though not necessarily at the same time, and by mowing.

Bulletin 154 The Ohio State University
Agricultural Extension Service

PROVIDING CONTINUOUS GOOD PASTURES

EARLY SPRING PASTURE

Early spring grazing may be provided through treatment of a permanent or meadow pasture area, or by means of special crops. The permanent pasture is generally most satisfactory.

Nitrogen-Treated Permanent Pasture.—Early growth of the permanent pasture is dependent upon good root reserves, some surface protection, an abundance of available nutrients, and favorable weather conditions. The root reserves and surface protection are provided by fall growth. Consequently, the area held for early spring grazing should not be closely grazed in the late fall of the preceding year. This area should consist of a good sod that has been liberally fertilized with phosphoric acid and manure or potash from time to time as outlined for the general pasture area. In addition, it should receive 40 to 60 pounds of nitrogen in sulfate of ammonia or other nitrogen carriers between January 1 and April 1, the quantity depending upon the amount of extra pasture required. This fall protection and March nitrogen fertilization will advance the possible date for beginning grazing in the spring by two weeks. One-half to one-third as many acres as there are animal units to be grazed should be provided.

In place of the other fertilizers mentioned above, a 10-6-4 may be used annually at the rate of 300 to 400 pounds per acre.

This area should be fenced, so that animals may be turned on and off at will. After the grass is eaten down, the livestock should be turned off until it has again made a growth of 4 to 5 inches. These periodic grazings may be continued as growth justifies through the season.

Timothy Meadows.—Timothy and orchard grass meadows with a good sod may be treated with 40 to 60 pounds of nitrogen and used in this same manner. Legume or mixed meadows also may be used, but in such event the nitrogenous fertilizer application should be omitted. Due to the demand for legumes as hay for winter, such areas are not generally used for pasture.

Rye, Wheat, and Barley.—Eight pecks of rye seeded in late summer or early fall provides good grazing very early in the spring. Winter wheat may also be used for this purpose. It cannot be seeded so early and provides less pasture in the fall, but remains in good grazing condition longer in the spring than rye. In the southern part of the state, winter barley is also a good crop for spring pasture. . . .

Sweet Clover.—On adapted soils, sweet clover seeded 12 to 15 pounds per acre in a grain crop the previous year serves well for this purpose. Caution should be used with all legumes to prevent their causing bloat of the animals. Livestock should not be turned in the first time when the plants are wet nor when the animals are hungry. A good plan is to give the animals a full feed of dry roughage or grain before turning in.

Once grazing has been started it should be continued without interruption, regardless of weather conditions. However, in case the animals are removed for several hours, the same precautions must be observed when they are again turned in.

SUMMER PASTURE

The summer period is generally the most troublesome. If the regular pasture is fertilized and not overgrazed earlier in the season, it will remain productive longer, and this period will be considerably shortened.

Reserve Surplus Area.—A few farmers reserve an area with little or no grazing in June so that a surplus of pasture remains on the land for grazing in July. With grazing in May, maturity is to some extent delayed, thus leaving it a little more succulent in July than it would otherwise be. Beef cattle men frequently hold certain areas ungrazed until late June.

Lespedeza in Permanent Pasture.— . . . Japanese and Korean lespedezas seeded in permanent pastures are very helpful in bridging the mid-season shortage. They make good growth during late July, August, and September, and reseed themselves for another crop the next year. The Korean lespedeza will not stand as close grazing as the Japanese, but it grows larger and matures earlier, thus enabling it to produce seed farther north.

Meadows as Summer Pasture.—Timothy, clover, alfalfa, or mixed meadows are commonly used for summer pasture. They should be cut early and not be grazed till there is at least 6 inches of fresh growth. The use of meadows in this manner not only provides pasture without the extra work of seeding a special crop, but it also produces a much higher quality of hay due to the necessity of cutting the hay earlier when the food value is higher.

The value of alfalfa as a hay crop is well recognized. Attempts at grazing have frequently resulted in destruction of the stand. The crop should be grazed only when there is a growth of 6 inches or more, and the grazing should not continue throughout the growing season. That is, either the first or third, or first and third crops should be cut for hay, and the remaining crops or crop only should be grazed. . . .

Sudan Grass for Summer Pasture.—Sudan grass is the most outstanding of the special crops that are available for summer pasture. One acre will provide grazing for three cows or the equivalent in other types of livestock from early July till frost. Twenty to 25 pounds of seed per acre, seeded just after corn planting during the latter part of May or early June, on a good soil carefully prepared and fertilized with 250 to 300 pounds of 4-12-4 fertilizer, will produce good grazing about 5 or 6 weeks after planting. Under emergency conditions the seeding may be made as late as the middle of July.

The exact date to begin grazing will depend to some extent upon the season. While usually about 5 or 6 weeks from seeding will be required, this may vary from 5 to 7 weeks. The plants should be 12 to 15 inches high, since the short young plants are sometimes poisonous. A good plan is to divide the field for grazing by means of an electric fence or otherwise provide two areas of Sudan grass on which the stock may be alternated. It is also desirable to turn stock off during wet weather, since otherwise they will injure the soil by tramping and may pull up many plants. Some farmers have a practice of preceding Sudan grass with rye or sweet clover, which provides early spring pasture the same season. After the rye or sweet clover has been utilized, the ground is plowed and prepared for Sudan.

Sudan Poisoning.—Some losses of livestock by cyanide poisoning, from grazing young Sudan, have been reported. We know of no authentic cases in Ohio, but suggest that grazing be started with caution. If the animals are not very hungry they are likely to detect the poison and stop grazing or look for other types of vegetation before taking a fatal dose. Do not graze young growth, and watch the animals carefully when first turned in. The poisoning is likely to show up within 30 minutes if at all.

If in doubt, a good plan is to turn in only a few animals at first and watch them for an hour. Even though the animal is nearly dead it may be quickly revived by an injection of sodium sulfite in the jugular vein by a veterinarian.

Korean Lespedeza.—Korean lespedeza . . . makes a good growth in late July, August, and September, and is worthy of trial as a special summer pasture crop. Two-thirds as many acres as there are cows to graze should be provided. It may be seeded at the rate of 20 pounds per acre in oats or winter wheat, as clovers are seeded, and grazed after the grain crop has been removed. Late in the fall the ground may be disked very lightly and reseeded to wheat. The lespedeza, if not overgrazed, will reseed itself and again produce pasture following the next grain harvest. Thus wheat and Korean lespedeza pasture may be produced each year. If preferred, rye or barley may be grown in the place of wheat and may be used for early grazing or hay rather than for grain.

Lespedeza does better than bluegrass in midsummer on unproductive soils, and in hot dry seasons. However, satisfactory yields may be expected only with favorable rainfall and some fertilization such as 200 pounds per acre of a 2-14-4 applied with the grain crop.

FALL PASTURE

Fall pasture is not generally a serious problem on farms with good rotation or permanent pastures, but where these are not available or where they are insufficient, other provisions are necessary. One hundred to 150 pounds of sulfate of ammonia, or the equivalent in other forms of nitrogen per acre, in the latter part of August will add materially to the fall growth of the rotation or permanent pasture area.

New Meadows.—New meadows very commonly make sufficient growth to justify some grazing during August and early September. This, however, should not be overdone, since a new meadow closely grazed may kill out badly during the winter. Where the growth is abundant, sufficient grazing to prevent the clover coming in head during the fall may be of value to the meadow as well as provide pasture, on condition that there is good growth when winter sets in.

Sweet Clover.—If seeded in the spring sweet clover will, for adapted soil and under favorable weather conditions, provide some fall pasture. The amount and earliness of spring production, however, is reduced by fall grazing. Consequently two areas, one for fall and one for spring, should be provided, or grazing should be extremely light. The place and management of this crop was discussed under the heading of spring pastures.

Rye and Barley.—Seeded in August or September at the rate of 2 bushels per acre, rye will supply abundant late fall pasture. This same area may also be used for further grazing in the spring. Where this pasture is utilized by dairy cows it is well to remove the cows several hours before milking in order to prevent off flavors in the milk. In the southern part of the state, early sown winter barley is also an excellent crop for this purpose.

BULLETIN 154 OHIO STATE UNIVERSITY
AGRICULTURAL EXTENSION SERVICE

SILAGE FROM HAY AND CROPS

SUGGESTIONS FOR MAKING AND FEEDING ALFALFA AND GRASS SILAGE

MAKING:

1. Cut alfalfa as nearly as possible at the one-tenth bloom stage. Do not put it into the silo when it is excessively wet with rain or dew. Light wilting in the swath is desirable except in the case of hay which is rather mature.
2. Load from the swath with a heavy-duty rake-bar type of loader or with a carrier loader in good repair. Moderate loads facilitate pitching to the cutter. If hauling is done with a truck, dump the load at the filler.
3. Cut at ¼ to ½ inch length, and tramp well in the silo.
4. Add 40-60 pounds of molasses per ton of green hay. One ton dry hay equals about three tons uncured hay. Turn off the molasses before the filler runs idle.
5. Don't crowd the filler unduly. Steady feeding helps avoid clogging the pipes.
6. Good silage can be made from any crop that can be fed green provided the moisture content is kept within the proper range—neither too wet nor too dry. 1/

FEEDING:

1. Feed both hay and silage.
2. With good silage and hay making up a large part of the ration, feed grain in accordance with the feeding standards indicated for equal dry matter in good hay. 1/

Advantages of Ensiling Grass and Legumes

The advantages of storing grass and legumes in the silo are listed in what is considered the order of their importance, and for the most part are so obvious as to need only simple mention.

1. The crop may be harvested in any sort of weather short of a heavy rain.
2. The crop is all saved — losses of ordinary haymaking which run as high as 40 percent or even higher in unfavorable weather, due to shattering of leaves and leaching by rains, are largely eliminated. The quality of the feed is superior to the best of dry cured hay.
3. Much space is saved — a ton of dry matter stored as silage occupies about one fourth as much room as it does when stored as long hay.
4. The fire hazard is eliminated.
5. The haying operation may be started earlier, with less delays because of cloudy weather, thus completing the harvest sooner and having less of the crop cut when overripe. 2/

Disadvantages of Ensiling Grass and Legumes

The old saying has it, "No loss without some small gain"; conversely there is no gain without some offsetting loss. It would be unfair to mention the advantages of this system of storing roughage and to lose sight of its less desirable features, which after three years' experience appear to be:

1. The necessity of handling approximately three times as much weight as when the grass is made into hay. This drawback disappears in proportion to the amount of extra handling of hay by the old method due to unfavorable weather.
2. The possible need for investment in a type of hay loader that will handle green grass satisfactorily.
3. Some cash expense for preservative. 2/

Practical Considerations

In conclusion, it must be emphasized that the method is not a magic formula for making good feed out of poor roughage. The man who puts poor quality, overripe grass or legumes into the silo with the idea that it will come out a high-grade feed is doomed to disappointment, as is also the operator who is careless with the details of the process or who uses a silo that is not tight.

The process is not expected to supplant ordinary haymaking, but rather to supplement it, making the farmer more independent of the weather, enabling him to plan his seasonal operations more effectively and to avoid the large losses experienced during such haying seasons as those of 1937 and 1938.

Places where it will fit in to best advantage are:

1. For late summer feed, to take the place of short pastures, especially during the dry spells so often experienced in July and August. Used for this purpose, one silo will serve for both corn and grass. If the grass silage is not all fed out when corn cutting time arrives, no harm is done for the corn can be blown right in on top of it.
2. On farms where the land is not well suited to the growing of corn, such as heavy, wet bottom lands which, in some seasons, cannot be prepared for corn until it is too late, but which will produce a heavy yield of grass year after year with no extra labor except that of top-dressing with either manure or fertilizer. 2/

Potential Silage Crops

It is entirely possible to make excellent silage from almost any crop that can be fed green. Slightly immature grasses,—timothy, smooth brome, quack grass—have been used for silage, as have the cereals, oats and barley cut when green. Various legumes have also been used, including alfalfa, sweet clover, red clover, soybeans and field peas and, of course, various legume and grass mixtures. 1/

When to Cut

The usual hay grasses and legumes should be cut for silage at a slightly less mature stage than they are usually cut for hay,—alfalfa at about 1/10 bloom, grasses at the blossom stage, and small grains in the milk before there has been any tendency of the stems to turn color. 1/

Desired Moisture

When cut at the proper stage of maturity, grasses and legumes contain from 65 to 75 per cent water. With 65 to 70 per cent moisture the crop is in condition for good preservation. When the material is wetter than this, due to immaturity or outside moisture, a period of 3 to 8 hours of swath curing in reasonable weather will bring it down to the desired moisture content. If the ensiled crop carries too much moisture the type of fermentation which follows results in bad smelling silage, whereas material ensiled when it is too dry may heat badly and mold due to insufficient packing. 1/

It cannot be too strongly emphasized that mature grass does not make good silage, especially if placed near the top of the silo. The weight at that point is insufficient to pack it so all air will be excluded, and pockets of mold result.

Moisture Content

For the same reason the crop, even when cut at the right stage, should not be allowed to remain in the field too long on a bright day, more especially spread out in the swath. The best silage results when the moisture content of the crop is between 60 and 75 percent. When it gets below 60 the same difficulty is encountered as noted above for mature grass.

An immature crop that because of unforeseen circumstances has dried to less than 60 percent moisture may, however, be safely used for silage provided it goes into the bottom half of the silo, where it will be well packed and the juices from the upper layers will seep down and be absorbed by it. Even this should not be practiced with material containing less than about 50 percent of moisture. Water added at the silo will help in such a situation, but the silage will not be of as high a quality as if the crop had not been allowed to dry out to any extent.

Excessive moisture is also undesirable since it means handling extra weight and only drains out at the base of the silo. For this reason it is best not to try to operate immediately after a heavy rain. Also if the crop is very succulent (80 percent or more of moisture), as is the case sometimes with young legumes, especially Ladino Clover, it is better to allow it to wilt before loading. 2/

Loading—Unloading—Chopping

Green, uncured hay may be loaded directly from the swath with a strong rake-bar loader. Older models are usually not heavy enough for this work. Sweet clover and small grains may be cut with a binder and the bundles pitched by hand. A minimum of loading is required, because loads cannot be large in volume since this green material weighs 3 to 3½ times as much as cured hay.

When the hauling is done by truck, dumping the load at the filler saves time and equipment. A length of woven wire fencing fastened to the back of the truck laid along the floor and up over the cab can be used. The end over the cab is then hooked by cable to a post back of the truck, and with the load held in this manner the truck is simply driven out from under it. 1/

Harvesting

The mowing may be done at any time of day, but as already indicated there will be less weight to handle if the standing crop is allowed to dry off a bit after heavy rain. When the moisture content is about right, the mower may be followed immediately by the side-delivery rake and the loader. Some operators use a windrowing attachment on the cutter bar of the mower

At most, the crop should not lie in the swath more than a couple of hours if the day is bright. It is important not to cut more than can be put into the silo on the same day, unless the weather is very damp and cloudy and gives promise of remaining so. Even then the mower should not be allowed to get far ahead of the loader. Six feet is the greatest length recommended for the cutter bar; 5 feet 6 inches is better. 2/

The old corn silage cutters have often given difficulty although, with the larger sizes successful operation is common. New types of silage cutters are designed to work effectively with forage crops. The cutting should be at ¼ to ½ inches to make possible best packing and proper exclusion of air. 1/

The Silo

Any type of silo which has proved effective for the preservation of corn may be used for grass silage. Trench silos on suitable locations can often be constructed quickly and economically. They may be so built as to lend themselves to packing with horses or tractors driven over the silage between actual filling operations. 1/

Preservatives

It is entirely possible to make good silage from grasses and legumes without adding any special preservative. However, making silage from such crops as alfalfa and sweet clover has become much more widespread since the fairly modern adoption of the practice of adding preservatives. 1/

These are of two general types: (1) Those in which the acid needed to prevent spoilage is added directly, and (2) those which contain sugar which ferments to form the needed acid. In the first mentioned type comparatively little fermentation takes place; the process is essentially a pickling. 2/

Molasses—If molasses, which essentially is 50% sugar, is added at the rate of 40 to 60 pounds to a ton of green ensilage there appears to be greater assurance of the desired type of fermentation. Since molasses is frequently not available locally the necessary supply should be arranged for in advance. The new type silo filler designed to add preservatives has an attached valve which automatically regulates the proper flow of molasses into the blower and shuts it off entirely when no material is going through the cutter.

If the automatic valve is not available, molasses can be added through the blower housing by running it from an elevated drum, usually a messy job, or by running it from a drum on the ground in which air pressure is maintained with a tire pump and the flow of molasses regulated through valves. Two valves are preferable, one set continuously to regulate the rate of flow, the other a shut-off. To obtain ease of flow, the molasses may be diluted with water. Whatever system is used, the molasses should be turned off just before finishing each load to avoid clogging the pipes.

The expenditure for molasses need not be regarded purely as a cost for a preservative. This material has a definite feeding value, molasses at $15.00 a ton being comparable to corn at 56 cents a bushel. 1/

Amount of Molasses

This depends on the nature of the crop. Legumes with their high protein content require more than grasses, as the tendency to rot is greater. Amounts which have given general satisfaction are:

	Per ton of green weight
For grasses or small grains	40 pounds[1]
For grass and clover (50-50)	60 pounds
For clover, alfalfa, or other legumes	75-80 pounds

[1] A gallon of molasses weighs 11 ¾ pounds.

In practice these amounts can only be approximated, but they serve as a useful guide. It is better to err on the side of too much rather than too little. Although most of the sugar in the molasses is converted by the fermentation into lactic and acetic acid, animals are able to use these acids as food so that the loss of nutrients from the added molasses is small. 2/

Other Preservatives—Such inorganic acids as phosphoric, sulphuric, and hydrochloric will aid materially in silage preservation, but their use is ordinarily much more expensive than is the use of molasses. The proper use of phosphoric acid not only aids in silage preservation but this material is of value in the livestock ration, and much of it eventually goes back to the soil with the manure. Like molasses it serves more than one purpose.

The inoculation of ensiled material with cultures of lactic acid bacteria does not now appear to be justified in view of limited experimental evidence. 1/

Phosphoric Acid Silage

Details of harvesting and filling are the same as for molasses silage, except that a much smaller amount of phosphoric acid is required. Amounts recommended are:

	Per ton of green crop
For grass	10 pounds
For legumes	17 pounds

These amounts are for commercial acid of 68 percent strength (48.7 degrees Beaume). Acid of greater or less concentration would be required in proportionally smaller or larger amounts.

Although it is possible to add the acid undiluted from the cask, it is now recommended to dilute it at the rate of 1 part of acid to 5 parts of water by volume.

When purchasing phosphoric acid for this purpose, care should be exercised to obtain a grade that contains only very small amounts of fluorine. The element fluorine, when present in any considerable amount in the feed, is injurious to cattle. A large amount of work has been done on this problem and a standard for fluorine has been established. To be acceptable for silage making, phosphoric acid should contain not more than 100 parts of fluorine per million of acid, or expressed on a percentage basis, 0.01 percent. 2/

A.I.V. Silage

"The A.I.V. method of silage preservation (named for the inventor, A. I. Virtanen, of Finland) requires the addition of strong mineral acids - usually a mixture of sulphuric and hydrochloric acids. This method is patented and permission to use it must be obtained from the holder of the patent rights.

"The phosphoric acid method not only has all the advantages of the A. I. V. method in being an effective preservative of the silage, but also has many other advantages. Phosphoric acid is less corrosive of machinery and silo walls than are the acids used with the A.I.V. method. It is also less dangerous to handle....

"When A.I.V. or phosphoric acid silage is fed, it is best to feed liberal amounts of legume hay (which is high in lime) or 4 ounces of ground limestone daily in order to neutralize the effects of the acid. Silage which is so high in acid as to be unpalatable may be treated after removal from the silo with air-slaked lime or finely ground limestone at the rate of about 10 ounces to 100 pounds of silage." 3/

Tramping

Air trapped in the silage may be a cause of spoilage. Tramping aids in expelling it. It is highly desirable to keep the silage level, especially near the top of the silo. It also seems advantageous to use heavy wet material as the last load, tramping this repeatedly for a few days after completing the filling. 1/

Acre Yields and Cost of Nutrients

The yield of nutrients from an acre of alfalfa is frequently equal to or even greater than that of corn in many sections of Michigan. On good corn land, corn will outyield almost anything in quantity but the expense of producing feed nutrients is likely to be greater with corn than with alfalfa. Farm surveys of the acre yield and the cost of digestible nutrients from various crops have shown that 100 pounds of digestible nutrients were produced in alfalfa at only slightly more than half the cost of the same quantity from corn, and at considerably less than half the cost of the same quantity from oats. Usually, however, the total digestible nutrients in roughages are inferior pound for pound to those in concentrates. Over a period of five years, first cutting alfalfa at East Lansing has produced an average of about 7 tons of silage an acre. Four tons from the first cutting would be a fair yield, equivalent to 1½ tons of hay, while 10 tons an acre is an excellent crop. Ten tons an acre of silage material were produced from first cutting alfalfa-bromegrass on plots at East Lansing in 1939.

Good grass or legume silage is likely to be superior to hay from the same crop on a dry matter basis. This is especially true of the Vitamin A content since this vitamin is usually preserved to much better advantage in silage than in sun-cured hay. Winter milk from cows fed good grass-legume silage is an excellent source of Vitamin A. 1/

Feeding Recommendations

Alfalfa silage may be fed in place of all the corn silage, or in place of part of the hay. Cows will consume more dry matter if fed some hay along with silage, than if fed either alone.

When about half the dry matter is hay and half silage (3 pounds of silage to 1 pound of hay) it is desirable to feed the silage following the morning milking, and the hay in the afternoon, but not immediately preceding milking time. Any uneaten silage should be removed from the mangers several hours before milking time. This system of feeding will prevent odors in the milk. 1/

The ensiled crop may be fed out at once, but it will keep better from day to day in the silo if first allowed to go through the fermentation process, which reaches completion in a month or six weeks. With legume silages especially, it is of even greater importance than with corn that the diameter of the silo be so adjusted to the size of the herd that the entire surface layer of silage is removed each day.

The usual method of feeding is the same as for corn silage, substituting the grass silage pound for pound. Where the silage consists entirely of alfalfa or other legumes, it may be necessary to feed smaller amounts until the animals become accustomed to the somewhat richer feed. From one half to two thirds the amount usually fed in the case of corn silage is suggested, with a gradual increase to full feed if circumstances warrant it. 2/

Palatability

Legume silage seems to be fully as palatable as corn silage to milking cows. The grass silages fed at the State College have not been eaten as readily as corn silage, but have always been cleaned up before the next feed, except in those occasional instances when lumps or flakes of moldy material escaped notice and were fed out. Young cattle ate the grass silage as readily as they did corn silage.

Experience here has led to the belief that it is not advisable to substitute grass silage entirely for dry hay. Animals fed on silage and grain only for several weeks seemed to be as greedy for dry roughage as they usually are for silage or other succulent feed when they have been restricted for some time to dry feed only.

It has also been observed in the State College herd that when grass silage and dry hay are both fed, the animals clean up their allowance of both much better if hay is fed at one end of the day and silage at the other, than if the allowances of each are halved and fed together. 2/

Milk Yields

Results are expressed on the basis of average daily yield of milk per cow, corrected to 4 percent fat, and show:

On corn silage	21.56 pounds
On grass silage	21.57 pounds
On dry hay	27.09 pounds
On grass silage	27.92 pounds

The grass silage was equal to corn silage and somewhat superior to dry hay for milk production. 2/

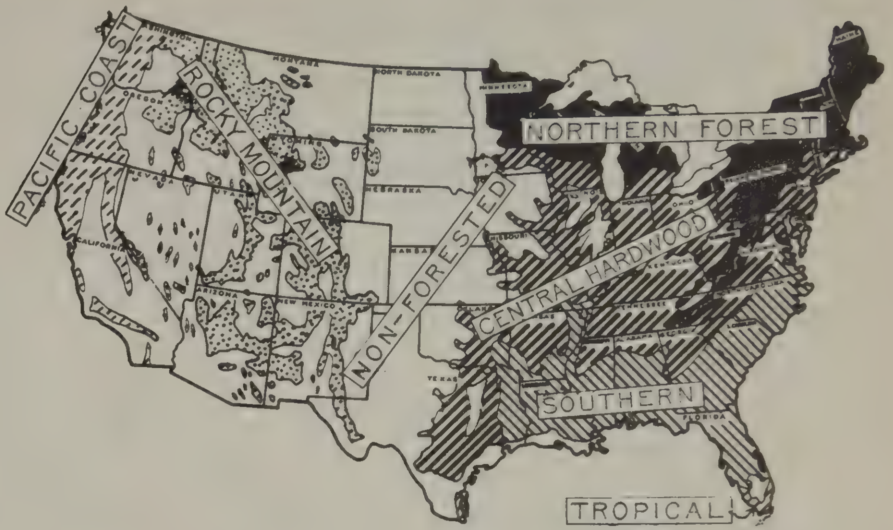
SILOS

For rated feeding capacity of silos and for silo capacity in tons see "Capacities Of Silos", Digest page 532.

1/ Michigan Circular Bulletin 173 3/ Illinois Circular
2/ Massachusetts Bulletin 362 (Agricultural Colleges)

FOREST REGIONS OF THE UNITED STATES
LISTING THE PRINCIPAL TREES OF EACH REGION

NOTE.—The order indicates the relative importance or abundance of the trees



NORTHERN FOREST

Northern Portion:
- Red, black, and white spruces
- Balsam fir
- White, red (Norway), jack, and pitch pines
- Hemlock
- Sugar and red maples
- Beech
- Northern red, white, black, and scarlet oaks
- Yellow, paper, black, and gray birches
- Aspen ("popple") and largetooth aspen
- Basswoods
- Black cherry
- American, rock, and slippery elms
- White and black ashes
- Shagbark and pignut hickories
- Butternut
- Northern white cedar
- Tamarack

Southern Portion (Appalachian Region):
- White, northern red, chestnut, black, and scarlet oak
- Chestnut
- Hemlock
- White, shortleaf, pitch, and Virginia ("scrub") pines
- Black, yellow, and river birches
- Basswood
- Sugar and red maples
- Beech
- Red spruce
- Southern balsam fir
- Yellow poplar (tulip poplar)
- Cucumber magnolia
- Black walnut and butternut
- Black cherry
- Pignut, mockernut, and red hickories
- Black locust
- Black gum
- Buckeye

CENTRAL HARDWOOD FOREST

Northern Portion:
- White, black, northern red, scarlet, bur, chestnut, and chinquapin oaks
- Shagbark, mockernut, pignut, and bitternut hickories
- White, blue, green, and red ashes
- American, rock, and slippery elms
- Red, sugar, and silver maples
- Beech
- Pitch, shortleaf, and Virginia pines
- Yellow poplar (tulip poplar)
- Sycamore
- Chestnut
- Black walnut
- Cottonwood
- Hackberry
- Black cherry
- Basswood
- Ohio buckeye
- Eastern red cedar

Southern Portion:
- White, post, southern red, blackjack, Shumard red, chestnut, swamp chestnut, and pin oaks
- Red and black gums
- Mockernut, pignut, southern shagbark, and bigleaf shagbark hickories
- Shortleaf and Virginia ("scrub") pines
- White, blue, and red ashes
- Yellow poplar (tulip poplar)
- Black locust
- Elms
- Sycamore
- Black walnut
- Silver and red maples
- Beech
- Dogwood
- Persimmon
- Cottonwoods and willows
- Eastern red cedar
- Osage-orange

Texas Portion:
- Post, southern red, and blackjack oaks
- Mountain and other cedars

SOUTHERN FOREST

Pine Lands:
- Longleaf, shortleaf, loblolly, and slash pines
- Southern red, turkey, black, post, laurel, and willow oaks
- Red gum
- Winged, American, and cedar elms
- Black, red, sand, and pignut hickories
- Eastern and southern red cedars
- Basswood
- Sand pine

Alluvial Bottoms and Swamps:
- Red, tupelo, and swamp black gums
- Water, laurel, live, overcup, Texas red, and swamp white oaks
- Southern cypress
- Pecan, water, swamp pignut, and hammock hickories
- Beech
- River birch
- Ashes
- Red and silver maples
- Cottonwoods and willows
- Sycamore
- Southern hackberry
- Honey locust
- Holly
- Red, white, and sweet bays
- Evergreen magnolia
- Pond and spruce pines
- Southern white cedar

UNITED STATES
DEPARTMENT OF AGRICULTURE
FOREST SERVICE
1938

TROPICAL FOREST

- Mangrove
- Royal and thatch palms
- Florida yew
- Wild fig
- Pigeon-plum
- Bloily
- Wild tamarind
- Gumbo-limbo
- Poisonwood
- Inkwood
- Buttonwood
- Mastic ("wild olive")
- Jamaica dogwood

PACIFIC COAST FOREST

Northern Portion (Western Washington and Western Oregon):
- Douglas fir
- Western hemlock
- Lowland white, noble, and silver firs
- Western red cedar
- Sitka and Engelmann spruces
- Western white pine
- Port Orford and Alaska cedars
- Western and Lyall larches
- Lodgepole pine
- Mountain hemlock
- Oaks, ashes, maples, birches, alders, cottonwood, madrone

Southern Portion (California):
- Ponderosa and Jeffrey pines
- Sugar pine
- Redwood and bigtree
- White, red, lowland white, and Shasta red firs
- Incense cedar
- Douglas fir
- Lodgepole pine
- Knobcone and digger pines
- Bigcone spruce
- Monterey and Gowen cypresses
- Western and California junipers
- Singleleaf piñon
- Oaks, buckeye, laurel, alder, madrone

ROCKY MOUNTAIN FOREST

Northern Portion:

Northern Idaho and Western Montana:
- Lodgepole pine
- Douglas fir

ROCKY MOUNTAIN FOREST—Continued

Northern Portion (Northern Idaho and Western Montana)-Continued:
- Western larch
- Englemann spruce
- Ponderosa pine
- Western white pine
- Western red cedar
- Lowland white and alpine firs
- Western and mountain hemlocks
- Whitebark pine
- Balsam poplar (Balm-of-Gilead)

Eastern Oregon, Central Idaho, and Eastern Washington:
- Ponderosa pine
- Douglas fir
- Lodgepole pine
- Western larch
- Englemann spruce
- Western red cedar
- Western hemlock
- White, lowland white, and alpine firs
- Western white pine
- Oaks and junipers (in Oregon)

Central Montana, Wyoming, and South Dakota:
- Lodgepole pine
- Douglas fir
- Ponderosa pine
- Engelmann spruce
- Alpine fir
- Limber pine
- Aspen and cottonwood
- Rocky Mountain red cedar
- White spruce

Central Portion (Colorado, Utah, and Nevada):
- Lodgepole pine
- Engelmann and blue spruces
- Alpine and white firs
- Douglas fir
- Ponderosa pine
- Aspens and cottonwoods
- Piñon and singleleaf piñon
- Rocky Mountain red cedar and Utah juniper
- Bristlecone and limber pines
- Mountain mahogany

Southern Portion (New Mexico and Arizona):
- Ponderosa pine
- Douglas fir
- White, alpine, and corkbark firs
- Engelmann and blue spruces
- Piñon and Mexican piñon
- One-seeded and alligator junipers and Rocky Mountain red cedar
- Aspen and cottonwoods
- Limber, Mexican white, and Arizona pines
- Oaks, walnut, sycamore, alder, boxelder
- Arizona and smooth cypresses

GENERAL DESCRIPTION OF THE FOREST REGIONS

"The original forests of the United States, exclusive of Alaska and the island possessions, are estimated to have covered a total area of more than 800 million acres, or nearly one-half of the total land area. Our present forest area is estimated at about 500 million acres, or 60 per cent of the original, nearly all of which is classed as commercial forest land. Of this area, some 189 million acres bear material of saw-timber size, with about 99 million acres in old growth, or "virgin" timber, and 90 million acres in second-growth timber; about 121 million acres in smaller timber suitable for ties, pulpwood, or fuel wood; 102 million acres of young growth; and 83 million acres with inadequate stands of young trees. In addition to the above 500 million acres, there are some 100 million acres of noncommercial forest land of low grade, chiefly bearing scrubby growth.

"The present total amount of standing saw timber is about 1,668 billion board feet, or about one-third of the original forest stand, of which nearly 90 per cent consists of pines, spruces, and other "softwoods", and the remainder of "hardwoods." There are about 1,346 billion board feet of old growth or virgin saw timber, and about 2,382 billion cords of wood in addition. Of the 500 odd million acres, about 88 million acres are in Federal ownership, 10,600,000 acres in State, county, or town ownership, and 396 million acres in private ownership, including lumbering concerns and farmers. The national forests contain about one-third of the standing saw timber and lumbermen own nearly one-half of the total. Farmers own about one-twelfth of the saw timber and one-third of the cordwood timber.

"In the eastern United States there are three principal forest regions distinguished by the kinds of trees and their relative abundance, namely, the northern, central hardwood, and southern forests. A little tropical forest is found in Florida and Texas. Forest lands in large bodies are found in Northern New England, northeastern New York, portions of the Lake States, central Pennsylvania, and the Appalachian region of the South Atlantic and Gulf States. The yellow-pine forest of the South is the last source of large timber production in the Eastern States. In other parts the forest lands consist chiefly of small tracts on the farms, comprising mostly from 10 to 60 per cent of the total farm lands of the individual States. About 20 per cent of the saw timber and 35 per cent of the cordwood of the United States (exclusive of Alaska and the island possessions) is found in the eastern forest region.

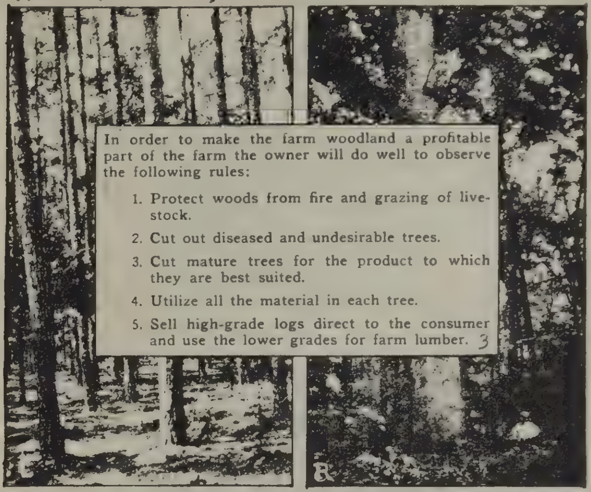
"The western forest regions consist chiefly of large bodies of timber extending over the main Rocky Mountain and Pacific Coast Ranges. Many relatively small timbered tracts cover the ridges and higher elevations, interspersed with treeless parks and sometimes widely scattered in large arid districts, particularly in portions of the central and southern Rocky Mountain region, where large areas of the outlying dry foothills of the mountains are clothed with low forests of juniper and pine. Heavy stands of timber characterize the Pacific Coast forest region. In the southern portion the timbered lands are surrounded with narrow margins of the low broadleaf tree forest, or chaparral. Over one-half of the total saw timber in the United States is in the forests of California, Oregon, and Washington: about four-fifths is found west of the Great Plains, or in the Western forest region.

"Alaska has a dense forest along the Southeastern coast, consisting of trees which grow to large sizes, and extension of the general forest type found in Washington and British Columbia. About nine-tenths of the timber is western hemlock and Sitka spruce. The total stand of timber is estimated at 85 billion feet board measure, 78 billion, which is located within the Tongass National Forest, in the extreme southeastern portion. The combined area of the two national forests in Alaska is about 21 million acres. The interior forests, practically all located within the drainage basins of the Yukon and Kusko Kwim Rivers, are composed of small-sized spruces, birches, and aspens and other poplars, which form dense stands over large areas. White spruce is the principal tree growing to saw-timber size. The interior type of forest is estimated to cover a total of some 50 million acres.

"The forests of Puerto Rico are tropical and may be divided roughly into "wet" forest, "dry" forest, and mangrove swamps. These wet and dry forests are separated by the central mountain range, which causes a heavy rainfall on the north-facing slopes and, likewise, a great shortage in precipitation on the south side. Forest vegetation culminates in density and luxuriance of growth in the tropical rain-forests of the northern and central portions of the island. In the southern portion, the lower mountain slopes, foothills, and coast lands are sparsely covered with an open growth of short-bodied deciduous trees and shrubs. The original forests of the island have largely disappeared through cutting, grazing, and burning. The second-growth forest, although irregular in occurrence, consists of a great variety of species and forest types."

FARMING THE WOOD LOT

THE FARM WOODS frequently furnish an essential portion of the farm income. Providing proper conditions for the growth of the trees will pay the farmer well both in comfort and in cash. If properly cared for, the woods will furnish at all times a convenient supply of timber, fuel, fencing, and the like for home use and at intervals will yield valuable material for market. If neglected or abused, farm timber stands are sure to deteriorate and may eventually disappear altogether . . . . 1)



In order to make the farm woodland a profitable part of the farm the owner will do well to observe the following rules:

1. Protect woods from fire and grazing of livestock.
2. Cut out diseased and undesirable trees.
3. Cut mature trees for the product to which they are best suited.
4. Utilize all the material in each tree.
5. Sell high-grade logs direct to the consumer and use the lower grades for farm lumber. 3

Results of good timber management of farm woods: **L**, thrifty shortleaf pines evenly spaced by proper thinning; **R**, a timber-minded farmer, 64 years old, had made a good income all his life from his woods. For this white oak he had been offered as much as $250.

About one-third of the total area of forest land in the United States is in farm woodlands. Practically all this area lies east of the plains region. These farm woods have an enormous producing power, but under present methods are producing only one-third to one-half of their capacity. . . . 3)

This means that about 500 million dollars in potential income from farm woodlands has never been realized by farmers in the United States simply because they have failed to develop and manage a growing stock in the woods that would make possible the realization of this income . . . . 2)

These bad cutting practices must be discontinued if the maximum returns are to be secured. It does not pay to cut a tree that measures less than 16 inches in diameter, breast high, unless it is wanted for some special purpose or will improve the stand . . . .

Proper utilization of the timber after it is cut is the final and too-often-neglected factor in getting the maximum return from the farm woods . . . . 3)

CLASSIFYING THE WOOD LOT

There are two general types of farm woods, each of which requires a different method of handling: (1) Those characterized by the presence of old trees which dominate the stand, and (2) those made up of a nearly even-aged stand of second-growth trees . . . .

In woods where the stand of old trees is not dense and reproduction is already well started, the mature trees should be cut as soon as this can be done profitably. Unless removed, these mature trees will suppress and kill young trees otherwise which would eventually be very valuable. . . .

Where the woods are made up of nearly even-aged stands of second-growth trees, undesirable species may predominate and may be crowding out the better ones, or the stand may be overcrowded or understocked and not reproducing. The improvement of such woods may be brought about by various cuttings known as improvement cuttings and also by practicing certain methods of regeneration . . . 1)

Two kinds of land may be selected for woodland: (1) Land that is clearly best adapted, by nature or by man's misuse, only for some form of woody vegetation; and (2) land that is from the standpoint of its capability suited to other uses.

Land in the first class, which may safely or economically be used only for some form of woody vegetation, may be devoted to the production of wood products, to wildlife, to recreation, or to any combination of these uses. . . .

The second class includes land now timbered and bare land which, for special reasons, a farmer may wish to use for woodland and for which he is willing to pay the expense of planting. The big problem, however, is encountered with timbered lands. On many farms, especially on the Pacific coast, there are forested lands that may be physically suited to other uses.

The farmer will have to decide whether to clear the land of timber and put it into some cultivated crop or pasture or to leave it in woods and develop it as a woodland. A number of factors must be considered. Many mistakes have been made in the past in clearing land that looked promising for cultivation but later proved unprofitable. This much is certain: It costs a good deal to clear land of timber growth. If no values are assigned to the timber products cut from the land, it usually costs somewhere between $50 and $150 per acre for clearing. Then there is the cost of conversion—plowing, seeding, fertilizing—and if the conversion is to pasture, there may be failures before a good stand of grass is obtained. All of this takes capital as well as labor. . . unless the case is clearly in favor of the conversion, it would be better to let the woods stand and assist nature in producing a worth-while timber crop on the land . . . . 2)

ESSENTIALS OF A GOOD FARM WOODS

The timber crop, like any other, should be judged by its quantity and quality. The end sought, therefore, should be to secure a full stand of trees of high quality. Fortunately, the quality of timber is determined very largely by how close together the trees are. To be of high quality, timber must be, for a considerable part of its height, free from limbs which are the cause of knots; it must be tall; and it must not taper too much from the butt to the top of the last log. In a dense stand of timber there is much competition for sunlight among the individual trees, with the result that height growth is increased. Trees in crowded stands are usually taller than those in uncrowded stands of the same age. When the trees are crowded so that sunlight does not reach the lower branches, these branches soon die and become brittle; they then fall off or are broken off by the wind, snow, or other agencies. By this process trunks are formed which are free from limbs, and hence of high quality.

When trees are crowded, their diameters do not decrease rapidly from the butts to the tops. In uncrowded stands just the opposite is true; height growth is usually less; the lower branches continue to live, increase in size, and form large knots; and there is a much greater taper in the trunks of the trees. It is evident, therefore, that in good stands the trees should be so crowded that the crown or top of each individual tree is nearly in contact with those of its nearest neighbors. A well-stocked stand of trees produces not only a larger number but also a greater proportion of high-quality trees than an uncrowded stand occupying an equal area. . . . .

This fact is of vital importance because the price of logs of first quality is usually from one and one-half to two times as much as that paid for logs of poor quality. Likewise clear straight trees are necessary to make poles or piling. . . . . 1)

PLANTING

After the farmer has selected the fields that are to be used as woodland, his next step in farm-woodland management is to decide what kind of growing stock to develop. This means not only the kinds of trees and the relative proportions of each in the mixtures but the sizes most likely to produce products of maximum value when harvested. The trees selected must be those adapted to the soil and the climate, that is, the best trees of the kinds desired that are found growing in the woods at the beginning of management. In the North the growing stock is likely to include such trees as white oak, red oak, maple, beech, birch, ash, and perhaps white pine, spruce, or hemlock. Farther south, southern pines would be prominent, also such hardwoods as oak, ash, gum, poplar, black walnut, and black locust. In the West the growing stock would include pine, Douglas-fir, hemlock, eucalyptus, or redwood . . . : 2)

The proper spacing to give in planting trees depends largely on the form or habit of the species and the character of the situation or site. In general, the more tolerant the trees are of shade and the more unfavorable the situation, the closer should be the spacing. Very close spacing reduces the number and the size of the branches, which means that the trees will be of higher lumber value. It means, however, a greater death rate among them because of competition, and a higher initial cost of planting because of the greater number of trees required per given area . . . . . 1)

Trees required per acre when spaced —				
12 by 12 feet	8 by 8 feet	6 by 6 feet	5 by 5 feet	4 by 5 feet
Number	*Number*	*Number*	*Number*	*Number*
303	680	1,210	1,743	2,178
Cottonwood (black walnut, 30 or 40 feet apart).	Yellow poplar, red gum, slash pine, white ash.	White pine, red pine, loblolly pine, shortleaf pine, red oak, black oak, black locust, southern cypress.	Hickory, white oak, chestnut oak, bur oak, post oak, red elm, basswood.	Sugar maple, yellow birch, beech, white spruce, red spruce, fir.

The species in the last two columns will withstand considerable shade without being killed, and accordingly are the ones that may most safely be used in planting midway between such trees as are shown in the first three columns . . . .

Continued on next page.

Selected from: 1) USDA Farmers' Bulletin 1177
2) USDA Farmers' Bulletin 1940 3) Ill. Circular 392

DOANE AGRICULTURAL SERVICE, Inc., St. Louis 12, Mo.

FARM WOOD LOT MANAGEMENT

If seed is to be sown or planted rather than trees planted, the quantity to be used per acre depends upon a number of considerations, such as the quality of the seed, the amount of preparation given the soil, the danger of destruction of the seed by squirrels, mice, birds, etc., its price, the rate of growth of the seedlings, and their sensitiveness to frost, drought, and other such damage. The uncertainty of successful results from broadcasting seed, even when the soil is prepared, makes it advisable to confine direct-seeding efforts to prepared and protected spots.

When the seeds are placed in prepared spots evenly spaced over the area, two such seeds as walnuts, hickory nuts, or acorns should be placed in each spot and about 10 of any of the other species. This is simply to guard against failure of the seed to sprout, its destruction by rodents, or the death of some of the seedlings after sprouting. 1

DENSITY OF STOCKING

The number of trees desirable per acre varies greatly with the age and prevailing size of the trees, also with the purpose or the kind of products to be grown. Table 1 gives the approximate numbers of trees per acre desirable for average good stands. The figures are generally applicable for oak, hickory, elm and ash and shortleaf and loblolly pines, but are 15 to 20 percent too low for maple, basswood yellow birch, beech, and white and red pines.

TABLE 1.—*Desirable number of trees per acre* [1]

Diameter 4½ feet, breast high (inches)	Number of trees [2] when their diameters range from—				Number of trees [2] when all are of uniform diameter
	2 to 10 inches	2 to 14 inches	6 to 18 inches	10 to 24 inches	
2	400	300			2,000
4	180	130			900
6	105	75	75		510
8	65	45	45		320
10	50	30	30	30	235
12		25	25	20	170
14		20	20	16	130
[illegible]			15	12	100
[illegible]			12	11	85
[illegible]				9	75
[illegible]				8	65
[illegible]				7	55
Total	800	625	222	113	

[1] Data furnished by E. L. Sponsler, University of Michigan.
[2] Of the respective diameters indicated in the first column.

....1

KINDS OR SPECIES OF TREES

From the standpoint of rate of growth and marketing, some species are preferable to others. Black walnut, white oak, and yellow poplar, for instance, are now of more value than black oak, sycamore, or beech. It is probably best, as a rule, to grow those species which will produce the largest amount of wood within a specified time rather than to attempt to grow the species most valuable at a particular time. This means that trees of the most rapid growth which are well adapted to the region and situation and not subject to serious insect or disease attacks should be left to build up the stand ....

Average number of years required to grow 1 inch in diameter	Species
2 to 4	Cottonwood,* black willow,* white willow,* honey-locust,* black locust.
3 to 5	Shortleaf pine, bald cypress, slash pine, loblolly pine.
3 to 6	Red gum,* silver maple,* white elm, yellow poplar,* hardy catalpa.
4 to 7	White ash,* green ash,* boxelder,* black walnut,* white pine, red pine,* butternut, red oak, southern red oak, black oak,* bur oak, aspen,* Osage-orange, basswood.
5 to 10	Hickory, white oak, chestnut oak, paper birch, yellow birch,* hard maple, beech.
8 to 10	Red spruce (second growth).
9 to 18	Hemlock, balsam fir.
18 to 25	Northern white cedar.

[1] Based on measurements of natural forest stands except where marked with an asterisk (*), in which case the figures are based on growth in forest plantations.

The slower-growing species, particularly those listed in the last four lines of the tabulation, will not reach merchantable size as soon as the others, and from an investment standpoint should not be favored in the young growth, provided some of the more rapid-growing kinds will succeed. The value of these slow-growing species for farm purposes, however, will often make it equally desirable to encourage the growth of at least a few of them if the owner wishes material particularly fitted for his own farm uses.... 1

CUTTING OR HARVESTING

The ideal stand has trees of all ages, from seedlings to mature trees, so spaced that as the big trees are harvested the next sizes move up to take their places, and the growing space is fully occupied. Actually, trees of different ages and sizes usually are pretty thoroughly mixed in the woods, but rarely in the ideal proportion.

This description of a well-developed growing stock perhaps gives a false impression that there should be no cutting until the trees, through growth, have attained proper sizes and relative proportions in the stand. That, of course, is not true, because this well-balanced growing stock is developed through cutting, and experience indicates that in most woods it takes a lot of cutting and a great many years to bring about anything like an ideal distribution of age and size classes. The woods also require protection from fire and grazing and from wind. If fires burn, or the cows eat up the young trees, the gradation in age and size classes is interrupted, and if such injuries are long continued there would naturally be an end to the forest. A close border of shrubs or young trees at the edge of the woodland will prevent the winds from blowing through and sapping moisture from the soil.....

Once the growing stock is fully developed, cutting will proceed each year or, if the forest is small, perhaps every 5 years for some products.....

Cutting farm wood required for fuel, posts, and poles in such a way as to improve the growing conditions of the woods is known as improvement cutting .... It is often the first cutting of a hitherto-unmanaged woods in order to remove the culls and cripples and generally renovate the stand. The best trees are given sufficient space horizontally and vertically so that they get the benefit of the sunlight, the air, and the moisture from the ground, which are required for satisfactory growth. One good tree is worth many poor ones. Quality brings a high price per unit volume.

When the trees are ready and the market is right, it is time to cut the big trees into sawlogs, poles, and fuel and some trees into pulpwood. In a good woods the next cut is always in sight.

The harvest cut is defined as cutting for the principal purpose of harvesting final-crop trees of any size produced in accordance with the plan of management. When individual trees or groups of trees reach the size and quality intended, they are considered mature. It is then time to investigate the market and find out what products can be cut from these trees that bring the best prices and the market specifications for such products. The harvest and improvement types of cutting are often made at the same time and it is important to keep in mind the distinctions between them because different rules apply.

One thing is common to each step where cutting is employed. That is, every tree to be cut or to be left in the stand is carefully selected in advance of actual operations. There is a specific reason for each selection.

The selection of trees to come out and those to be left is not often an open choice. For example, the market may be for railroad ties, which are generally low-priced products, and consequently, it would usually pay to hold any trees that give promise of growing within a reasonable time from tie size to sawlog size. Sawlogs as a rule are worth more than ties. The usual tie-size trees are 11 to 15 inches at a point 4½ feet from the ground. A 12-inch tree may produce two railroad ties that have an average value in the woods of 50 cents apiece, or a total of $1 can be obtained for salable products from that tree. Assume that this tree is growing at the rate of 3 inches in 10 years, which is fairly good growth; in 20 years it will total 18 inches, and at that time it will yield 200 board feet, Doyle rule. At $10 per thousand feet in the same location where railroad ties are worth 50 cents, the products from this 18-inch tree will be worth $2. In other words, the 12-inch tree allowed to grow for 20 years will double in value. The tree has earned 3½ percent compound interest, which is equivalent to about 5¼ percent simple interest • • • Saw logs may be worth more than this calculated price in 20 years... 2

(Continued on page 187.2)

Selected from: 1) USDA Farmers' Bulletin 1177
2) USDA Farmers' Bulletin 1940

FARMING THE WOOD LOT

(Continued from page 187.1)

A rule of thumb for the desirable space between healthy trees left for further growth is known as D+6, which means that the proper spacing between any two trees expressed in feet may be found by taking their average diameter in inches at breast height and adding 6. For example, a 10- and a 16-inch tree should be spaced about 19 feet apart $\left(\frac{10+16}{2}+6\right)$. A 7- and a 9-inch tree should be about 14 feet apart. If trees stand closer than this there is need for more growing space.

In addition to the volume allowed by this spacing rule, one should harvest trees of the largest sizes as follows: An average of 1 tree from each acre for each year since the last cutting. In a 40-acre woods to be cut annually, this would be a total of 40 trees; in one cut every 5 years, it would be 200 trees.

Another rule of thumb is never to cut more than 20 percent of the volume of the growing stock in any 5-year period. For example, if the growing stock 10 inches or more in diameter amounts to 7,500 feet log scale per acre, cut not more than 1,500 feet in this period. In slow-growing stands that will be too heavy a cutting and in fast-growing timber it will be conservative. The application of this rule should include all of the material removed in the form of the major product, usually sawlogs, but not the fuel, posts, and small products removed to give the growing stock more room. If cutting is on the basis of careful selection of trees to be removed, with the purpose in mind of manipulation of the growing stock so as to produce a fairly regular wood harvest as part of the farm business, experience will soon indicate safe cutting limits . . . . 2)

When the timber in the woods is being cut, steps can be taken toward insuring the perpetuation of the woods and at the same time improving the quality of the stand. Lumbering operations which remove only trees of high quality, such as white oak or black walnut, and leave dead, dying, insect-attacked or diseased specimens and inferior trees should not be practiced. The diseased and dying trees will be a menace to the remaining healthy ones, and the beech, black gum, ironwood, Virginia scrub pine, and other inferior species which remain will scatter their seed over the ground, and very largely make up the future stand. In cutting, therefore, or in selling the standing timber, provision should always be made for these inferior species to be taken down to a smaller diameter than the more valuable ones and for all defective trees to be removed. To make such a provision effective, the owner should mark in some manner all the trees which he desires cut or all those which he wishes to retain in his woods. To induce the lumberman to take inferior species and small and defective trees, it may be necessary to make some concessions in regard to price. The trees which remain will be the nucleus of the future crop, and valuable species should be in the majority in sufficient quantities to seed the cut-over areas.

Unless small, straight, and vigorous trees bring higher prices per unit of measure than large ones or unless they are of species which it is desirable to eliminate, they should not be cut by the woods' owner, nor should he allow lumbermen to cut them. As trees 10 inches and less in diameter cut only very small amounts of low-grade lumber, they are of little value. Ordinarily, if they are to be sawed into lumber, the lumberman figures on paying little or nothing for them. He cannot afford to do otherwise. Trees of such sizes, however, are usually growing rapidly or will do so when the other trees are removed and they receive more sunlight. As they increase in size, they will cut not only more but also higher-grade lumber; they will, accordingly, increase faster in value than in size. It is therefore apparent that they should not be cut.

In felling trees care should be taken not to throw them into the midst of a group of young trees; otherwise these may be seriously broken or bent. Further, by the exercise of a little care when the logs are being dragged out of the woods, much breakage, bending, and trampling of the young growth can be avoided. It must be kept in mind at all times that these young trees are the first stage in the growth of the mature timber. Every care should be taken to prevent their destruction, particularly those of the better species, because such young trees represent an established growth several years old. A new stand of seedlings may not be difficult to obtain, but it will not have the advantage of these several years of growth. When standing timber is sold, the lumberman should be charged with protecting this young material as fully as possible . . . . 1)

PERPETUATING THE STAND

If the woods have not been too badly abused and there is no heavy sod of grass present, excluding stock and fires will in time normally result in the site's restocking itself by natural seeding. Good seed years, however, come only at intervals. Even in a good seed year, the seedlings may not be able to get a start because of the sod, the packed condition of the soil, or unfavorable weather. Natural reproduction may, therefore, be very slow, becoming satisfactory in amount only after from 5 to 10 years. It will often be advisable, therefore, when there is a good crop of seed on the trees, to put the ground in such shape as to insure a good crop of seedlings. Before the seed is scattered from the trees in the autumn, the ground may be disk-harrowed or cultivated, or hogs may be turned in to root up the soil. The seed will then lodge in the soft earth, where, upon sprouting, the roots may easily take hold. To prevent undesirable species from obtaining a foothold, any trees of such species large enough to bear seed should be cut at the time pasturing is discontinued.

A complete cover is as necessary in growing wood crops as it is for cotton or corn. Interplanting thickens the stand and introduces "new blood" into the growing stock.

To secure natural reproduction an old, mature, dense stand will normally have to be opened up in two, three, or more cuttings, each taking one-third to one-half or less of the trees. The first cutting is designed to open up the crown cover somewhat, so that the leaves on the forest floor may decompose more rapidly, the mineral soil become exposed, and the germination of seed be more certain. The remaining trees become more wind-firm, and, as a result of their crowns receiving more sunlight, they produce more seed. When the forest floor is in good condition, the later cuttings may be made during winters following heavy seed crops. With the removal of these trees the conditions will be favorable for the germination of the seed and the growth of the seedlings. Neither of the first two cuttings should be so heavy that enough light will reach the ground to encourage a heavy growth of weeds or grass. The later cuttings should be made after the seedlings are well established and no longer in need of the protection of the old trees. . . .

Some woods are so run down that very little seed is produced and natural reproduction cannot be secured even if the area is disked or harrowed, or at least cannot be secured rapidly enough to be satisfactory. Often it is desirable to grow species different from those present or to grow a greater proportion of one species than of another. Sometimes no woods exist at all, but one is desired. In these cases planting or sowing is necessary. The planting of small trees is by far the more successful and economical method. Nut trees, such as oaks, hickories, and walnut, are the chief kinds started by direct seeding. . .

It is not always possible to secure a new growth through sprouts from the stumps of felled trees. Most conifers do not sprout effectively, and the majority of hardwoods do not sprout vigorously beyond the age of 60 years. Basswood is an exception, for it can be depended on to sprout well from healthy stumps up to an age of 100 years. Vigorous individual trees of other species may also often do likewise. Sprout regeneration, then, is especially applicable to hardwood stands which are to be cut when young, as, for instance, stands which are to be cut over every 20 to 30 years for posts or fuel. It should be remembered that sprouting is most vigorous from low stumps. It is also better from the stumps of trees cut during the winter or very early spring. Such sprouts, moreover, are less subject to severe winter injury at the end of their first season's growth than are those arising after timber is felled during the summer.

In felling the trees, care should be taken to injure the stumps no more than can be helped, as the best sprouts will ordinarily arise from good, clean stumps. Because of the clean cut which it makes, the ax is a better tool than the saw in felling trees where regeneration by sprouts is desired. Regardless of what tool is used, the surface of the stumps should be slanting, so that water will not collect and promote rot . . . . 1)

Selected from: 1) USDA Farmers Bulletin 1177
2) USDA Farmers' Bulletin 1940

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

FARM WOOD LOT MANAGEMENT

PASTURING

Pasturing the woods has been one of the chief causes of their depletion and low earning power. The severity of the damage depends largely upon the number of stock and the size of the woods. One characteristic of a heavily pastured woods is the almost complete absence of young growth, or its existence only in small ragged patches as broken or scrubby stuff. Cattle, horses, sheep, or goats eat young seedlings, particularly the hardwoods, trample them out, or brush against them and break them off. Hogs eat the seed and thus prevent reproduction from starting, or root young seedlings out of the ground, and sometimes eat the roots.

In those parts of the southern longleaf pine region where hogs run at will, they are known to do a great deal of damage to longleaf pine seedlings and often damage trees several feet in height. When driven out of the swamps by high water in the late winter and early spring, they root up the longleaf pine seedlings and eat the sponge bark on the roots. Observations first carried on at Urania, La., have shown stands of several thousand longleaf pine seedlings per acre on areas protected against hogs and no seedlings on adjacent areas which were unprotected. Generally the grazing of other livestock in the southern pines is not particularly harmful and may even be beneficial in reducing the fire hazard.

Tree growth is severely damaged through trampling and wounding the roots and through compacting the soil to such an extent that it is almost impervious to water. Horses sometimes peel the bark from trees. Old trees show the abuse in the dying of their tops, in a decrease in the amount of foliage, and often in the beginning of decay at the butts. A light cover of grass then makes its appearance and increases the drying of the soil.

When the crown canopy of a woods in unbroken and young growth is not desired, a few cattle may be grazed. They should not, however, be turned in when the ground is very soft—when the frost is going out, for instance, or during a rainy season. The soil is too easily compacted at that time. When it is desired to secure natural reproduction, hogs may be turned into the woods shortly before the seed is to fall. They will root up the ground and put it in good condition for the reception of the seed. Thereafter, however, they should be kept out.

Goats and sheep should be allowed in the woods only when it is desired to clear up brush of undesirable species, so as to make possible the reproduction of better ones. If the better species are already present in mixture with the poorer ones, some method of cutting, rather than grazing, should be followed to clear the area of the poorer species. Horses should at no time be permitted in the woods.

Stockmen are quite generally agreed that grass produced under the shade of timber is considerably less nutritious than the same species growing in full sunlight. It is also usually much more sparse. The actual value, then, of woodland pasture is small. Fifty cents to one dollar per acre per year is probably a liberal estimate of the value of woods forage. Thrifty, fully stocked stands of timber will grow at the rate of 250 or more board feet of lumber per acre or the equivalent in other products per year. Considering only this growth and assuming the value of the standing timber to be from $5 to $15 per 1,000 feet board measure, the value of the timber growth is from $1.25 to $3.75 per acre per year. Stumpage values are sometimes much higher than this, especially if there is considerable white oak, yellow poplar, walnut, or other valuable species in the stand. If the timber is given good care, moreover, the growth should be as much as 500 board feet per acre per year. The greater value of the woods for growing timber, as compared with the value of its forage only, is apparent

It must not be thought possible to secure this growth of timber and utilize the woods for pasture at the same time. Grass in the woods is almost an infallible indication that the woods are not fully stocked or are being mistreated. Grass will not thrive without strong sunlight, and in a woods in good condition sunlight reaches the forest floor only to a very limited extent. Pasturing and timber production cannot, therefore, be practiced on the same area except to their mutual disadvantage; and the combination of the two will not pay the owner as well as the practice of either one separately.

However, the value of shade to stock is sometimes very considerable as compared with the loss in timber growth because of pasturing. If, however, shade rather than forage is the chief value of the woods to stock, it can usually be provided by allowing the stock to range in only a portion of the woodland. The remainder may more profitably be devoted to the production of wood alone. . . . 1/

FIRE PROTECTION

Fortunately, on the great majority of farm woodlands protection from fire is not difficult. This is true of the smaller woodlands that are separated or surrounded by cultivated fields or pastures. Ordinarily, fire-prevention measures on the farm and quick action to stop fires that may start are the only steps required. In some regions, however, forest fires are a community problem, either because the general sentiment favors annual burning of the woods or because no organized effort has been made to get at and eliminate the causes of fires or to maintain an organization for the detection and prevention of fires. Where farm woodlands are parts of large wooded areas, such as the continuous coniferous forests in the West and the South, individual farmers often are powerless to prevent fires from destroying their wood crops. Community action is therefore required, and in most States the State forester, with the assistance of Federal funds, has the authority and the means of maintaining a fire protective system. In some States fire districts are organized in which private owners pay part of the cost of protection. There are few localities in the United States where the fire problem cannot be solved by community action if the farmers and other timber owners want the fires stopped. Often farmers must take the initiative in organizing some sort of a protective association, but both State and Federal organizations are anxious to help, and local people can obtain this help by soliciting it, especially where they are willing to assume part of the cost of protection.

In many farm woodlands protection is facilitated by the proper location of fire lanes and roads. Fire lanes are of various types and range in width from 2 to 20 or more feet. Along some of these strips removing the brush and young trees and raking the leaves each year is all that is needed. Where the fire danger is greater, these fire lanes may be made into plowed strips that are disked sufficiently to keep down vegetation. In some places such strips are seeded to grass and mowed periodically. In others the fire lanes are made into roads so as to serve a dual purpose.

Proper disposal of the brush and other refuse in connection with logging operations may be an important fire-prevention measure. The manner in which brush is disposed of depends on the fire risk in the locality. Where the risk is high, piling the brush and burning it during safe periods is usually advocated. This is true in most of the western coniferous forests. If the fire risk permits, it is far better from the standpoint of good silviculture to lop and scatter the brush. The recommendation of the State forester for any particular locality is the best guide to brush disposal. . . . 2/

INSECTS AND DISEASES

Damage from either insects or disease is always possible. It is more likely to be serious with some species of trees than with others. Disease is likely to be worse in woods which have been damaged by fire, grazing, lumbering, wind, or any other agency which has served to break the bark or roots and expose the living inner tissues.

The damage done by a leaf-eating insect is apparent in the destruction of the foliage. When the insect is one that works under the bark and either bores into or girdles the tree, its presence is manifested by fine sawdustlike particles of wood which fall out of the burrows and collect either around the base of the tree or at the entrance of the burrows. Sap or gum also often exudes from these entrances. When the attack is serious, the leaves of hardwoods change to their autumnal color, while those of conifers become brown or red. The bark of trees killed by girdling insects becomes loose; and on its inner surface, as well as on the surface of the wood of the tree, there will be found more or less numerous regular wavy passages, or so-called galleries. These are formed by the grubs as they eat their way under the bark. The wood is their food during the course of their development.

The presence of wood-rotting disease is indicated by hollow stems, discoloration and rot of the wood, and by fruiting bodies. These are the mushroom- or bracket-shaped bodies which appear somewhere on the trunk, branches, or roots of the tree, most often at some point where the tree has been wounded. Other types of disease which may seriously damage trees but do not rot the wood may have rather inconspicuous fruiting bodies but are manifested by an unhealthy appearance of the tree, dying of the branches, distorted twigs or branches, sunken places in the bark, and possibly other indications. 1/

CONTROL OF EROSION

A well-stocked woodland protected from fire and grazing offers no erosion hazard. The problem of soil erosion on the farm is largely one of open fields. In a forest, the overhead tree canopy and the forest floor, protected by the leaf litter and kept porous and granular by the roots and the living organisms in the soil, act as effective barriers to erosion. The cutting of the forest, especially where silvicultural requirements may demand some small areas of clear cutting, may cause some temporary soil erosion, but this erosion will be very temporary if good silvicultural practices are followed. In fact, the intial stage of erosion in the form of soil movement in the forest is often one of the indications of too heavy cutting. Another indication of the same thing, which may later result in soil erosion, is the drying out of the topsoil and the absence of leaf litter, obviously caused by too much exposure to sun and wind. All of these indications will be watched for by the good forest manager. Precautions to be taken in connection with logging operations are the location of the skid trails and roads as nearly on the contour as possible, throwing brush and limbs on any spots where the soil has been exposed in logging operations, and cutting lightly on steep slopes and on any slopes where the soil seems to be unstable. . . . 2/

Selected from: 1/ USDA Farmers' Bulletin 1177
2/ USDA Farmers' Bulletin 1940

200 Live Stock, Dairying, Poultry

200 Live Stock, Dairying, Poultry

Livestock and Dairy

Dairy -- You'll be money ahead to cull low producers and old stock from your herd and replace with higher producers. It takes between 4,000 and 5,000 pounds of milk, depending on feed costs and milk prices, to break even. You'll take less for your culls, but you can buy better cows cheaper now too. U.S. average price per milk cow in January was $156, a decline of 26% from a year earlier.

The first four months of a cow's lactation may be taken as a fairly accurate indication of what she will produce in ten months, according to Purdue University. Production in the first 120 days should be at least half of the cow's anticipated yields; otherwise, she should be sold and the feed marketed in a more profitable manner. For example, a cow with less than 3,000 pounds of milk to her credit at the end of the first four months is unlikely to give 6,000 pounds in ten month's time.

New Brucellosis Laws. Three laws concerning brucellosis passed by the 1953 Illinois Legislature will affect Corn Belt farmers. Two deal with cattle and the third with hogs.

One of them provides that all herd owners of dairy or breeding cattle in Illinois shall submit their cattle to test upon request by the Department of Agriculture and that, by July 1957, all owners must be cooperating in an approved eradication plan.

The second law is important to dairymen. It provides that after July 1, 1955, no Grade A milk or Grade A milk products may be sold from a herd unless the herd is certified and is under an approved brucellosis eradication plan. After July 1, 1957, all milk offered for human consumption must meet this requirement. Herds must be tuberculin-tested before milk is sold.

This applies to all dairymen in the Chicago milkshed, regardless of what state they live in. Several eastern markets already have such regulations in effect.

The third law replaces the so-called boar law with a general swine brucellosis law. It provides that no one can sell any female swine four months of age and over for breeding purposes, or sell or offer the services of any boars for breeding purposes, unless they are accompanied by an official brucellosis certificate issued by a veterinarian within 60 days of sale or service.

Swine coming into Illinois must be tested within 30 days of entry, and Illinois swine to be exhibited must be tested within 90 days of showing, according to the law.

Reactors must be tagged in the left ear. They can't be offered for breeding purposes and can be sold only for slaughter.

Livestock breeders in other states, as well as in Illinois, should become familiar with these laws if they expect to sell breeding stock to Illinois farmers.

NECESSARY SELLING PRICE FOR HOGS ONE MONTH FROM NOW TO BREAK-EVEN IN PUTTING ON 50 POUNDS ADDITIONAL WEIGHT ON HOGS

Price of Corn per Bushel Now	Price of Hogs in Dollars Per Cwt. Now				
	20.00	22.50	25.00	27.50	30.00
(Dollars)	On Hogs Weighing 200 Pounds Now				
1.00	18.25	20.65	22.25	24.25	26.25
1.25	18.81	20.81	22.81	24.81	26.81
1.50	19.38	21.38	23.38	25.38	27.38
1.75	19.94	21.94	23.94	25.94	27.94
	On Hogs Weighing 225 Pounds Now				
1.00	18.45	20.50	22.55	24.59	26.64
1.25	18.98	21.02	23.07	25.12	27.16
1.50	19.50	21.54	23.59	25.64	27.68
1.75	20.02	22.07	24.11	26.16	28.20

USDA DATA

This table is a good guide to use in deciding if you want to feed your hogs to heavier weights this spring. Because fall pig numbers were down 9% last fall, a strong spring market is expected. Here's how to use the table -- Let's assume, corn costs $1.50 per bushel and hogs are selling for $25.00 per cwt. today. Then the necessary selling price one month from now to break-even would be $23.38.

Break-even price means the price needed to get back the cost of feed at present prices for the extra month, plus 25% for other costs such as labor, use of equipment and risk. Generally it takes about 4.5 bushels of corn or its equal in other feeds to fatten a 200 pound hog up to 250 pounds and about 4.6 bushels to put 50 pounds gain on a 225 pound hog.

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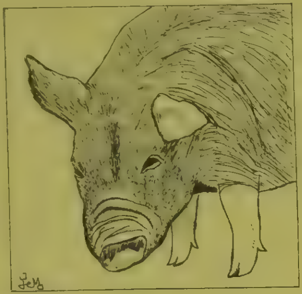
HOG DISEASES

Bringing new hog diseases to your farm is one of the dangers of buying breeding stock. A reminder is especially important this year when breeding stock is scarce and high-priced and many buyers are less cautious in their scramble to buy.

Infectious Atrophic Rhinitis is becoming the biggest problem to many hog producers. Usual symptoms are poor appetite, repeated sneezing, nose discharge and formation of wrinkles around the nose. If young pigs become infected from the sow, they usually start sneezing at 3-4 weeks of age. In severe cases the snout becomes puffed on the sides, and crooked. The bones of the nose and face may be destroyed in later stages.



Scientists believe atrophic rhinitis is caused by tiny parasitic animal organisms called tricomonads which can contaminate soils and buildings. However, it is most commonly spread by infected animals so it's best to sell all these.

Clean up lots and equipment before replacement hogs are brought in. Scrub buildings and feeding floors with hot lye water.

DOANE farm managers advise:

→ Don't keep hogs crowded up in tight, stuffy buildings. Use open-fronted buildings.

→ Make full use of clean legume pastures.

→ Have several feeding and watering points and try to keep the hogs spread out.

→ Sprinkle dusty areas with oil.

→ Use highly fortified vitamin and antibiotic protein feeds.

→ Use the healthy sows and boars in your herd as long as possible.

→ When buying boars and breeding stock, examine the entire herd. Look for crooked or wrinkled noses, sneezing, nose discharges, lean lanky shoats, unevenness of herd size.

→ Buy feeder pigs from disease-free herds.

→ Destroy pigs which are severe cases. They won't be profitable.

Erysipelas is a baffling problem. It occurs in two main forms -- acute and chronic. When the acute form strikes, temperatures flare, hogs go off feed, refuse to move around and may die within a few days.

The chronic form is usually not fatal, but pigs are stunted, make slow growth and are unthrifty. Leg joints become swollen and knotty.

Once established, the tough erysipelas bacteria organism can live around a hog lot for years. Normal-looking animals can carry the bacteria and pass them on in body wastes, yet never show symptoms. Other pigs can be exposed through eating and drinking. Mild cases may occur which might go unnoticed and may result in immunity, or a serious outbreak can hit suddenly.

Control -- Erysipelas is best prevented by building up immunity in the animal.

Two methods are generally used -- serum alone, or a combination of culture and serum. These are similar to serum and virus-serum methods used for hog cholera control.

Serum alone does not produce the disease in the animal but builds up passive immunity because of the erysipelas antibodies it contains. Immunity lasts only a few weeks.

Culture-serum treatment has been used to provide longer immunity, but how long it lasts has always been questionable. Then too, the culture contains live erysipelas bacteria which could spread the disease if not properly used.

New Developments -- Erysipelas has been consistently difficult to reproduce in swine for experimental work. A new skin scarification test recently developed by USDA workers gives an accurate laboratory test for immunity against erysipelas and opens up new research fields.

By using this new test it was learned that culture-serum vaccination of pigs a few days old had only limited value for protecting these pigs through weaning age, and no value at all for guarding them up to market time. Pigs vaccinated at about 2 months old, however, still had about 60% immunity at market age.

It was found that pigs born from gilts which were vaccinated with culture and serum shortly before breeding were immune through the sixth week, and had some protection to the eighth week.

This means that hog raisers may be able to protect hogs against erysipelas with two steps:

- Gilt vaccination -- protects pigs to weaning.
- Weaner-pig vaccination to carry them through to market.

More research and testing will be needed, but many farmers are already using such a plan with good results.

DAIRYMEN

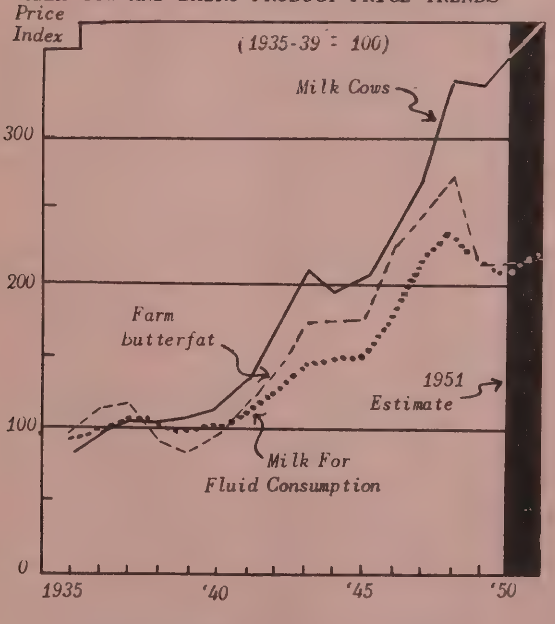
DAIRY OUTLOOK IMPROVES

Spurred by Korean war activity, the outlook for dairy has improved considerably since last spring.

Milk production in the U.S. for the January-October period was 103.6 billion pounds. For the same period in 1949 it was 102.1 billion. Production for the last few months, however, has been down slightly from a year ago.

Production of most manufactured dairy products is down. Only evaporated milk is appreciably greater than a year earlier. In October, production of creamery butter was smaller by about 11 per cent and American cheese by about 6 per cent. Currently butter production is about 15 per cent less than a year ago. Higher consumer incomes will increase fluid demand, and less will be available for manufacturing. Government purchases of butter and cheese have fallen to practically zero, and the large USDA storage stocks now hanging over the market are being reduced.

MILK COW AND DAIRY PRODUCT PRICE TRENDS



Higher costs are also ahead. Feed prices have increased more than dairy prices in the last year, and the milk-feed price ratio is slightly below a year ago, and below average. Cover your feed needs for several months. Buy the equipment and supplies you will need for the next 6 months. It will be good management to keep bought ahead.

Selling fluid milk will be most profitable -- check the costs that would be necessary to convert from a manufactured milk or butter market. Tighter regulations will soon make mechanical coolers a necessity. Better get one now, if you have future plans to buy.

DEEP INSEMINATION NOT NECESSARY

Old idea that to breed a cow deep in her reproductive tract would increase chances of conception has been exploded by Illinois dairy scientist, N. L. VanDemark and A. Moeller.

Theory behind idea was that sperms travel slowly and had a better chance to reach the point of fertilization if they traveled only a short distance. Calculated under a microscope, sperm movement was thought to take 4 to 5 hours to reach the point of fertilization. Using a new method of measuring sperm movement inside the cow, they found the sperm moves much faster -- reaches the fertilization point in as little as 2½ minutes.

Field results agree. In tests with 6,600 cows, insemination in the cervix produced results as good as when sperm was placed in the uterus.

Dry Cow Management -- Give each cow at least two months dry period. Data from a Pennsylvania study shows how a longer dry period may increase returns:

→ Seventeen of the 23 cows (Holsteins) increased average daily production following longer dry periods.

→ For 60 lactations preceded by an average dry period of 53 days, average production was 10,520 pounds F.C.M.*

→ For 33 lactations preceded by an average dry period of 92 days, average production was 11,248 pounds F.C.M.*

**To compare records with the 23 first lactations, they were corrected for age and time milked and were converted to a 4 per cent fat-corrected-milk basis (F.C.M.)*

These figures are based on preliminary studies. No general conclusions can be given yet.

Cow care during the dry period can make or break a dairy operation. Feed dry cows enough grain to put them in good condition (some may need 10 pounds or more daily). Cows in good condition at calving may start with as much as 25 per cent higher daily production and maintain this spread for the entire lactation.

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Special Message To —

POULTRYMEN

EGG PRICES WITHOUT SUPPORTS

Egg prices will not be hurt when the government quits support, December 31. Because of increased seasonal production, a decline from early winter levels is normal, but ☞ egg prices for the next 3 months will average above a year ago. Here's why --

Smaller Production -- Hens and pullets on farms January 1 are expected to total about 425 million -- 4 per cent less than January 1, 1950. A higher percentage of these will be hens (they lay about one-fifth fewer eggs than pullets) and early pullets past their peak of production. With higher feed prices, the layers may not be fed so well.

Cold Storage stocks of shell eggs are now very low. Holdings for 35 cities on December 16, totaled 19,639 cases and for the five year average, 304,901 cases. Storage operations will probably remove as many early '51 eggs from the market as in early 1950. This can be expected because of the current low stocks, profitable storage operations this year, and the possibility of war induced higher prices.

Bigger Demand will be due to increased population, high consumer income, more men in military service and less competition from higher priced meats. Compared to a year ago, we have about 2,300,000 more people to feed. Armed forces will be a million greater than a year earlier, and soldiers consume about 200 more eggs per man than civilians. More eggs will be needed to supply chicks for the growing broiler industry.

Feed Prices will be higher, hence little or no improvement in the egg-feed ratio, but egg production will be profitable for efficient poultrymen in 1951. Only trouble spot may be in Midwest where low quality eggs were sold to government drying plants.

Chick Hatch for the first 11 months of 1950 totaled 1,445,993,000 chicks. This compares with 1,449,620,000 for the same period in 1949 -- a decrease of less than one per cent. Only regions reporting fewer chicks hatched than in 1949 were: East North Central, West North Central and the Pacific States.

Brighter Canadian Outlook -- The Canadian chick hatch totaled only 64 million this year, 21 per cent smaller than in 1949. As a result, officials estimate egg production during the year ending August 31, 1951 will be about 10 per cent less than the 1949-50 year, and will be about equal to the domestic consumption.

Consumption of eggs in Canada during the first 9 months of 1950 was estimated at 250 million dozen -- a 13 per cent increase over the same period a year earlier. In 1949, Canadians consumed only 252 eggs per person -- 122 below our level.

WHEN SHOULD CHICKS BE STARTED?

Overhead costs and labor expense of the commercial egg farmer can be reduced by buying chicks in 2 or 3 different lots. A three-year study of out-of-season hatching of white leghorns by the New Jersey Experiment Station showed that spring-hatched chicks were better than fall and winter hatched leghorns in the number of eggs produced, size of eggs, and longer laying period.

John C. Taylor, New Jersey extension poultryman, points out some interesting results of the study. (1) Spring hatched birds produced as many eggs when egg prices were highest as did the fall and winter hatched chicks. (2) Spring hatched birds produced a higher percentage of large and medium eggs, fewer pullet and peewee size eggs.

Taylor says, the study shows that leghorns can be profitably started any time during the first six months of the year.

In surplus areas. where the seasonal price spread is greater, early chicks are most profitable. "There is about twice as much profit in producing eggs the last six months of the year as there is in producing them the first six months", says Mahlor Sweet, Ohio extension poultryman.

COST TO GET STARTED WITH POULTRY

Frank D. Reed, Main Extension Poultry Specialist gives the following figures for building and equipment investment.

"Well-built houses ... will run about $1.00 per square foot of floor space. Remodeling jobs run from 30 to 75¢ per square foot. Laying shelter type of buildings can be constructed for about 50¢. Equipment costs per layer, including necessary equipment for raising replacements will run from 50¢ to $1.00 a bird -- with 75¢ a reasonable average. (Figure 3 sq. ft. for leghorns, 4 sq. ft. for heavy breeds.)

"For broilers, investment in buildings will range from 60¢ to $1.00 a bird. Cost of equipment (brooding system, feeders, waterer, etc.) will run from 30¢ to 50¢ a bird."

→ Make your plans so the poultry operation will be an economical unit, large enough to provide adequate labor returns. Maine's present standard for a one man operation is 2000 layers or 10,000 broilers -- double the figure of a dozen years ago. Some operators now handle 30,000 to 40,000 broilers without extra help.

ONCE-A-DAY VS. TWICE-A-DAY FEEDING

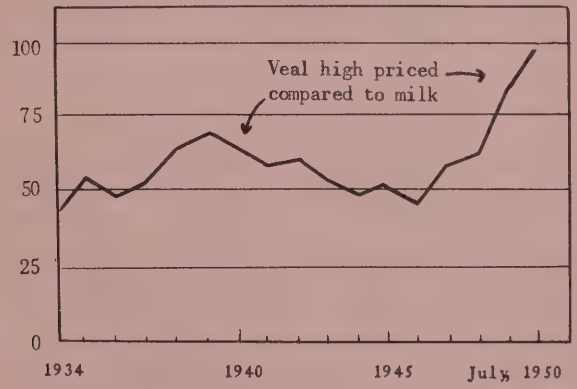
Cow Numbers— According to the June 1950 estimate, numbers of milk cows on farms totaled 22,702,000, down only 3 thousand from last year, but about 3 million from the record number reached in June 1944. Reductions in the northern regions were offset by increases in the southern states -- 33,000 in the South Atlantic region, and 58,000 in the South Central region. Two per cent fewer spring heifer calves were saved than a year ago.

TWO-WAY INCOME FROM DAIRY COWS

Beef prices have been bid so high that many good milkers have gone to slaughter instead of staying on the farm. The butterfat-meat animal relationships are about the lowest on record. When buying dairy stock, favor the big animals that will sell at a good price when they have finished their useful life as milkers. Look for young stock that show promise of developing into large cows. The price of beef will be good as long as consumer income is high.

Pennsylvania bankers recently told us that some dairymen now prefer heavier cows with Brown Swiss, Holstein and Shorthorn breeding because of high beef prices.

MILK - VEAL RATIO



Pounds of Milk * Equal in Value to One Pound of Veal Calf.
* Prices paid to farmers by condensaries

If you have the labor, hold "bob calves" (2-3 day old calves) for vealers. In manufactured milk areas, the price relationship is very favorable.

Dairy Back-Log — Creamery butter in storage on August 31 totaled 237 million pounds -- an all-time record high. Storage holdings were almost 90 per cent greater than average for this time of year and more than 50 per cent greater than last year. Of the 237 million pounds, the government owns 166 million. American cheese in storage also broke all previous storage records -- 285 million pounds on August 31. The government holds 94 million pounds of this. Stocks of all classes of cheese are at a record 374 million pounds.

Twice-A-Day Feeding of dairy cows was challenged by a USDA experiment at their Field Experiment Station, Huntley, Montana during the winter of 1947-48. Briefly the results indicated that, "When the cows were fed twice a day they ate 10 per cent more alfalfa hay, produced 6 per cent more milk, and required 70 per cent more labor for feeding than when they were fed once a day". The most economical system would depend on the relative price of milk and cost of feed and labor.

The test was conducted with 10 Holstein cows that were divided into two comparable groups and fed on the double reversal plan.

Group A - 50 days once a day - 50 days twice - 50 days once.
Group B - 50 days twice a day - 50 days once - 50 days twice.

They point out that "the differences are small" and that they "might not be so great if the feeding periods were longer or if an entire herd were shifted to once-a-day feeding". Cows are creatures of habit -- easily upset by change.

Results reported by a commercial feed company from experiments on its own research farm indicate a substantial saving of labor, without reduction in feed consumption or milk production when the herd was changed from twice-a-day to once-a-day feeding.

MILK COMPANY PROFITS

After a seven year study of six leading milk companies in the New York market, Cornell concludes, "that consumers can hope for no reduction in the price of milk, nor can producers expect any increase in returns through further curtailment of dealers profits in the New York markets".

PROFITS & CAPITAL EARNINGS COMPARED

Business	Profit - Cents per dollar of sales	% Return on investment
Milk Companies (NY)	1.0	3.4
Meat Packing (US)	1.2	8.6
Baking (US)	4.4	12.4
All Manufacturing (US)	5.0	11.5

"If the spread between what the farmer gets and what the consumer pays is to be narrowed, this must be done either by further curtailment of distribution services or by increasing the efficiency of services performed."

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TURKEY AND BROILER PRODUCTION

LADINO CUTS FEED COSTS IN HALF

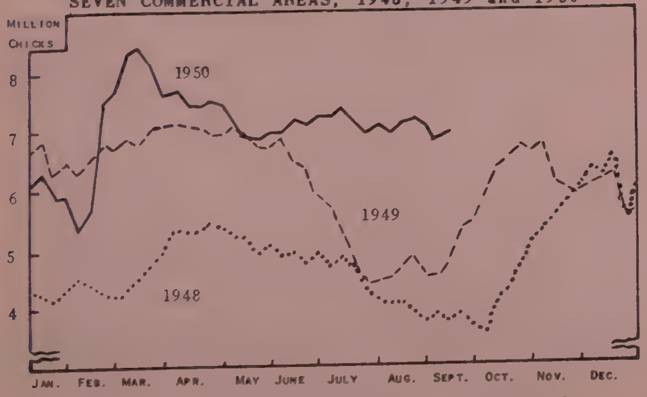
Ladino returned 100 dollars per acre when the Ohio Experiment Station at Wooster reversed the usual range program. They put hens on Ladino in April and raised the new crop of pullets in the laying house. The hens did not have to be sold when the pullets were housed; they completed their egg production and were sold on a strong market just before Thanksgiving.

On April 25, 1949 a confined flock of 180 Rhode Island Red hens in 65 per cent production were divided into two comparable groups of 90 each. One group was continued indoors on the same ration. Two 10x12 foot portable colony houses set on an acre of Ladino were used to house the others, and within a week their feed was gradually changed to a corn and minerals all-mash ration. This was made up of 95 per cent coarsely ground corn, 2 per cent steamed bonemeal, 1 per cent common salt, 1 per cent chick size oyster shell or high calcium limestone, and if not otherwise provided, 1 per cent insoluble grit. (Cost at present prices $2.65 per cwt. -- more than $2.00 under the going price of laying mash).

Average egg production from April 27 to November 15 was 51 per cent for the hens on Ladino and 49 per cent for those confined. Mortality was 7 and 14 per cent respectively. The hens indoors required 7 pounds of feed, and their eggs cost 25 cents a dozen. The hens on Ladino pasture required only 4.6 pounds of corn and minerals at a cost of 13 cents a dozen.

Prices Of Broilers -- are they headed for a slide? From the supply standpoint, yes. But it will not be serious if consumer demand is as good as estimates indicate. Placements have held up throughout the summer -- since July, they have been running over 2 million per week ahead of the last two years.

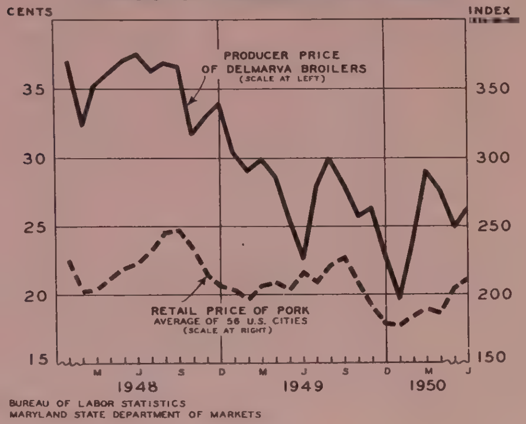
WEEKLY BROILER CHICK REPLACEMENTS IN SEVEN COMMERCIAL AREAS, 1948, 1949 and 1950



More competition will be coming from hogs and turkeys. There were 3 per cent more pigs saved this year than in 1949 or 1948. Six per cent more turkeys were raised this year than in 1949, and 39 per cent more than in 1948.

Prices of chicken and pork generally move together. The price of hogs has already dropped about $4 from the summer high and general thinking is that it will slide at least another $1.50 by early December. Note how the broilers seem to be closing in on pork.

PRICES OF BROILERS AND PORK



SOURCE BUREAU OF LABOR STATISTICS
MARYLAND STATE DEPARTMENT OF MARKETS

A Record Turkey Crop -- Six per cent greater than last year and 1 per cent greater than the previous record, 1945 -- has started to market. Production is above that of last year in all regions except the West, where it is down 7 per cent. Increases from last year are 18 per cent in the South Atlantic, 12 per cent in the West North Central, 11 per cent in the East North Central, 9 per cent in the South Central and 5 per cent in the North Atlantic States.

Some observers do not expect total production to go above last year because of more Beltsville Whites and other small birds but this opinion is not generally shared. USDA says, "Total production of turkey meat is expected to be at a record level with a separate trend toward large, broad-breasted birds for boned turkey, turkey halves, roasts and steaks more than compensating for the trend toward the smaller-bodied birds". No direct turkey support this year, but military purchases will help. During World War II, armed forces took slightly over 10 per cent of the nation's turkey production.

Quality of this year's crop is better than ever, say most field reports. A cool, rainy summer gave the birds good pasture, they started eating corn earlier, and there was very little trouble from pendulous crop. Sell birds when finished. When 26 weeks old, they take 7.5 pounds of feed to produce a pound of gain, at 32 weeks they require 14.8 pounds of feed per pound of gain.

According to growers intentions, 26 per cent of the crop will be marketed in October or earlier, 39 per cent in November, 28 per cent in December and 7 per cent in January or later. Period by period, these figures compare with 23, 38, 29 and 10 per cent for 1949.

WHAT'S NEW IN DAIRYING

TAILOR-MADE COW STALLS

Your milk cows need tailor-made stalls if you use a stanchion barn. We recommend pen stabling and the loafing barn, but if you are going to remodel or build a stanchion barn, make the stalls to fit the cows. There are two reasons for doing this. The cows are more comfortable, and it helps prevent injuries to the udder and teats.

Here's how Cornell University (New York) recommends you fit stanchion-type stalls to your cows where the cows are all about the same size. Measure one of the cows from the front of her shoulder blade to her tail. Then add 3 inches for proper length of stall from gutter to curb. Width should be 80 per cent of this total length. For a tie stall, add another 3 inches to the length.

If your cows come in different sizes, its not necessary to make all the stalls big enough for the largest cow. There are two common ways to vary stall sizes. One is to angle the gutters slightly, so that you get different stall lengths throughout the barn. The other is to jog the stanchion curb line so that you have some stalls one length and some another.

FORECASTING MILK PRODUCTION

The Ayrshire Breeders Association has announced a method whereby it is possible to accurately predict the annual milk production of cows on the basis of 50 to 70-day milking records. The valuable thing about such a forecast as this is that it enables dairymen to know what the breeding value of a bull is about eight months before the completion of his daughters' annual lactation period (305 days). This means that if you have a bull that is pulling down the herd average, you'll know about it just that much sooner and can get rid of him before he does further damage.

Currently, forecasts of production for 100,000 Ayrshire cows are being made. It is claimed that the statistical analysis of the 50 to 70-day factors will enable a herd's annual milk production to be forecast with 99.25 per cent accuracy. Whether or not this new method can be used or will be used with other breeds is not yet known.

BRAHMAN CATTLE COME TO THE DAIRY

The hump-backed Brahman cattle are playing a big part in the development of the beef cattle industry in the South. The Brahman and Brahman crosses are very much in evidence in herds all through the coastal regions.

Now work is going forward on crossing the Red Sindhi, a milking strain of Brahman from India, with dairy cows. The hope is that the Brahmans will do for dairying in the South what they have done for beef production -- and develop more heat tolerant and productive dairy cattle for southern conditions. So far, crosses have been made with Jerseys, Holsteins, and Brown Swiss. It's still too early to get much idea of what the results will be.

MORE MILK COWS

Dairy cow numbers increased last year by one per cent. This was the first increase in 5 years and broke the longest decline in milk cow numbers on record.

With lower income in many areas, more farmers are turning to the milk or cream check as a steady source of cash income. Greatest increase in dairy herds was in the South, where local markets for fluid milk have been strong enough to cause an increase in herds. Georgia milk cow numbers jumped by 7 per cent. Numbers in most Corn Belt states continued on down and were the smallest in 20 to 25 years.

Future changes in number of milk cows will depend considerably on the market for butter. Every change of one pound in butter consumed per person annually would mean about 3 billion pounds of milk, or at current levels of production per cow, about half a million cows.

SILAGE HAS NO EFFECT ON MILK FOR SWISS CHEESE

There is a lot of confusion over the feeding of grass silage to cows whose milk is being used for making Swiss cheese. Some makers claim that the silage contaminates the milk and hurts the quality of the cheese.

☞ There is no evidence whatsoever to indicate that feeding of grass silage can affect the quality of the milk.

The common argument advanced against the use of silage milk is that the milk itself is not "healthy" as it comes from the cows. The objectional organisms that cause the trouble do not occur in the normal udder of the cow. The only way they can get into the milk supply is by external contamination of the milk. That means that the only way grass silage can contribute to this condition in milk is if the farmer throws some silage into the milk. Feeding silage to the cows won't hurt milk quality anymore than feeding anything else will. (Based on U. of Wisconsin information)

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POINTERS ON POULTRY

Better Pullets with Better Pasture -- Cut 10 to 15 per cent off your feed bill and provide a safety factor against vitamin deficiencies with pasture. It is one sure way of reducing costs in 1950.

Save your best pasture for the pullets -- one acre for about 400. Ladino is best.

Top dress it now with fertilizer -- as recommended in your area.

Plan supplemental pasture if needed -- oats and rape for early pastures; sudan grass and soybeans for summer pastures.

Mow frequently -- when 7 inches or more.

Do not restrict feed -- early pullets pay best.

NEW MARKET FOR FARM COCKERELS

Farm cockerels treated with hormone pellets and marketed as prime roasters (caponettes) at about 20 weeks of age will suffer less from direct competition with broilers.

Dressing plants report 3-6 per cent less shrink in dressing caponettes and often they bring a 5 to 6 cent premium over roasters.

The hormone pellets are injected under the skin of the neck just behind the comb. In birds under fifteen weeks of age this should be done about 3-4 weeks before killing, and about 6 weeks before killing for birds over fifteen weeks. Pellets cost about 3 cents each, and the operation is simple and fast.

Automatic Feeders in a Pennsylvania study saved .44 pounds of feed per pound of broiler meat produced, and .3 to .5 pounds of feed in the production of a dozen eggs. This could amount to an annual saving of over 3 tons of feed in a flock of 1,000 hens.

Labor saving too -- one producer saved one hour daily for an 11-1/2 week period with 1,500 broilers, another saved 10 minutes daily with 700 layers. By combining savings in feed and labor, automatic feeders are thought to be a sound investment in layer or broiler flocks of over 1,000 birds, especially if new hand feeders are needed.

BROILER EFFICIENCY FACTORS

Efficient producers will weather low prices. Dr. R. O. Bausman, Delaware University, says producers who meet the following standards* can obtain reasonable returns for their capital, labor and management.

→ Size of flock -- 20,000-25,000 birds

→ Birds cared for per man -- 13,000

→ Feed per pound of broiler -- 3.1 pounds

→ Rate of gain -- 0.25 pounds per week

→ Age and weight when sold -- 3 pounds at 12 to 13 weeks

→ Mortality -- not over 6.4 per cent

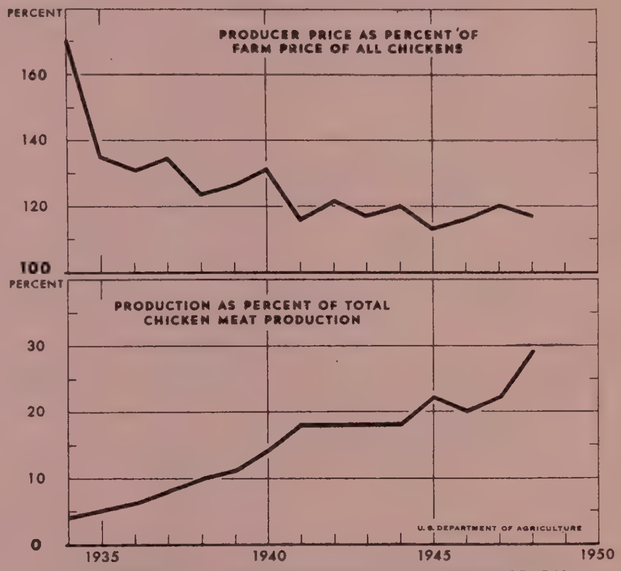
*(*Based on survey of 102 Delaware broiler flocks.*)

Broiler Production Costs -- For producers who wish to check their costs the Virginia College suggests the formula:

4.4 x cost feed per pound = (cost of feed)
3.5 x cost per baby chick = (cost of chick)
.06 x cost labor per hour = (cost of labor)

Total of three items divided by 0.92 = cost of production per pound.

Broiler Prices have averaged higher than the price for all chickens, but the difference is being reduced as broiler production increases. In 1949 over 318 million broilers were produced -- 454 per cent more than 1935-39 average.



COMMERCIAL BROILERS: PRICE AND PRODUCTION AS PERCENTAGE OF ALL CHICKENS, 1934-48

As the number of eggs laid per hen increases, less hens will be needed and more chicken meat will come from broilers instead of farm flocks. And the spread between broiler and chicken prices will continue to narrow. Producers will be able to make money with cheaper broilers by increasing efficiency.

Chick Sales -- Farmers plan to buy 12 per cent fewer chicks than last year. (BAE estimate). Decreases are planned in all regions, except the New England States.

January chick output was a record high for the month. For February about the same as a year ago, and indications are for chicks hatched in March to be about equal to last year.

DAIRY FARMERS FACE THE FUTURE

Low prices will continue during the immediate future. The problem now is to cut costs and in other ways adjust operations to hold expenses down.

Sell Cull Cows Now -- The price of milk cows depends on the price of milk and beef. A cull cow is worth her weight in beef and that's about all. Beef prices in particular are expected to come down during the next 4 to 6 months. Dr. Stanley Warren of Cornell, in writing about the drouth in New York and the New England states, says, "many of our dairy farms face a roughage shortage and lower prices. One good piece of advice to these men would be to cull now".

Grow Replacement Heifers -- this is sound practice for the small dairyman and those outside the big milk sheds. Prices will go down; but the cash cost of producing replacement heifers is low, if you have a little extra time, pastures that are not fully utilized and extra roughage. This plan provides another source of farm income without changing the system of farming. Diversity is important on a down market. In recent years Canadian farms have been supplying most of the replacement cows for the Northeast.

Produce Quality Milk -- The little extra time required to produce quality milk is the best possible way to protect your investment in buildings, equipment, cows and machinery. Indiana farmers last year lost an estimated $200,000 due to "rejected milk".

Consider A Pen Barn -- The pen-barn milking parlor arrangement is gaining favor all the time because it cuts labor requirements. Farm managers now know how to produce quality milk with this system. You can't afford to build a high-cost "grandpa" type barn in these days of mechanical milkers and high-priced labor. (See Digest Page 334.7)

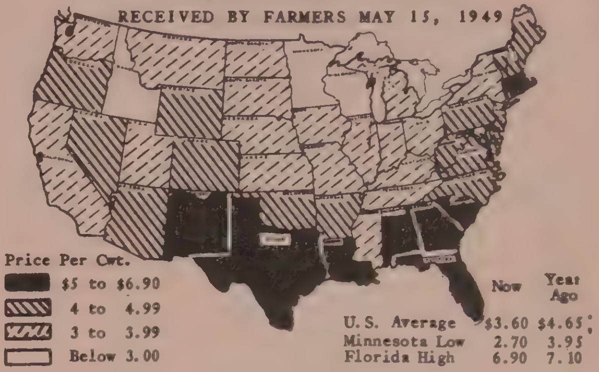
FORMULA PRICING

Dairy farmers are worried because price formulas that kept milk prices going up during the war now work the other way.

In April this year the blend price for milk delivered in the St. Louis milkshed was $3.59. This was based on $3.759 for Class I (which goes into bottles) and $3.059 for Class II (which goes into ice cream and other by-products). These prices in turn were built up from a Base Price of $2.859, a figure which depends on the price of butter and powdered milk at the present time. A year ago in April the blend price for St. Louis was $4.80.

The map shows the May 15 wholesale price of milk by states.

WHOLESALE PRICE OF MILK RECEIVED BY FARMERS MAY 15, 1949



	Now	Year Ago
U.S. Average	$3.60	$4.65
Minnesota Low	2.70	3.95
Florida High	6.90	7.10

Producers in the 30-odd markets operating under a Federal Milk Market Administrator have hope of doing something about "formula prices". The first attempt was the "Boston Plan", worked out about a year ago. It is based on the index of department store sales in the area, the wholesale commodity price index, and cost of farm labor and feed.

The formula worked to the advantage of farmers in the area until the inflation bubble broke. New York producers liked the idea so well that when their old formula was suspended because "it did not accurately reflect current or changing economic conditions", they adopted the plan. But, now they'd like to write a brand new formula that would hold prices up in periods of business recession. The August price of milk, under the Boston formula is expected to drop more than 40 cents per hundred.

No individual or group of individuals could be expected to take such adjustments lying down. Farmers through their representatives are expected to win some concessions. But, the trend of dairy farm income will be down.

Holding prices high when city incomes are falling forces consumers to buy less milk. This forces more milk into the cheaper butter and condensery outlets, with the result that blend

(Continued p. 202 Column 2.)

DOANE AGRICULTURAL DIGEST ® JUNE, 1949

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TROUBLE FOR POULTRY FARMERS

Poultry producers appear headed into price troubles. The situation will worsen steadily as the fall season approaches.

Chickens -- Baby chicks produced this year total 1,086,255,000 compared to 862,415,000 last year. And, the demand for more chicks is still heavy. According to USDA reports the number of chicks booked on June 1 for July delivery was 89 per cent above last year.

Plan to sell cockerels and cull pullets as fryers at not over 3 pounds in order to get them to market as quickly as possible. This will hold cost per bird down and avoid some of the risk of selling on a declining market.

Turkeys -- Real trouble with poultry is expected when turkeys begin to come to market next fall. Through May, 62 per cent more poults were started than one year ago. Hatcheries still had 58 per cent more turkey eggs in incubators on June 1 than a year ago.

These figures indicate that total turkey production this year may be up 50 per cent or more. Prices in November and December may fall to about 20 cents per pound -- unless the government supports the price. If prices drop as expected the retail price of turkey meat will compare more favorably with pork. It will be a factor in forcing hog prices down to support levels (about $14.50 in December) and will depress chicken prices during the holiday season.

Eggs -- The government continues to place a floor under eggs at 35 cents per dozen -- midwest points. This establishes the "country store" price and there is nothing extra for quality eggs.

During the hot summer months, however, producers who can get on a graded outlet for their eggs will be well paid. The hotter the weather the greater the premium for good eggs. The outlook for fall is not too bright. With feed costs down farmers find it profitable to produce eggs at support levels. They are increasing the size of their laying flocks. This means more eggs again by late fall. The government will be forced to finance a larger support program next winter than they have this year.

RADIANT HEATING

Radiant heat (heat pipes in floor) is very efficient but requires a larger capital outlay and overhead costs are higher than on non-central heating systems. Main advantages appear to be high labor efficiency, uniform floor temperature, fuel economy and a better use of floor space. It is especially practical on farms where large numbers of turkeys or broilers are grown the year round. It is impractical on farms where only one or two lots are brooded per year. The fixed overhead costs per bird decrease as number of lots produced per year increases. A radiant heat installation must not remain idle. The savings in fuel and labor can be lost in fixed overhead costs through non-use.

FEEDING LAYING PULLETS

"One of the most promising feeding systems is a 20 per cent protein mash and scratch-grain mixture, fed in the ratio of 60:40. In order to save the labor of measuring the mash and grain each day and the extra labor of feeding the grain in the litter, 60 pounds of mash has been mixed with 40 pounds of grain in the feed house and used as a hopper-fed complete mash." Univ. of Del.

DAIRY FARMERS' FUTURE

(Continued from Front Page)

prices fall. The cycle doesn't stop here, however. Surpluses of cheese, condensed milk, dried milk and other dairy products begin to build up. It is at this point that we are in the habit of calling in the government.

The government first supported dairy prices in August, 1933. In 1938 the government took a total of 3.059 million pounds -- milk equivalent. During the war years and up to the present time, government purchases were high for military and relief needs.

Mr. Brannan, Secretary of Agriculture, in laying out his "Bold New Program", has left the door open for much stricter control over dairy production. High prices which restrict consumption, encourage production and result in surpluses which help hasten the day when the milk administrator will be able to set quotas and otherwise dictate what you do on your farm.

In England where "social planning" has gone much further than in America, farmers find that quotas work both ways. Over there, farmers who fail to meet this quota can be set off of their land. In accepting government controls and quotas, we should not overlook the two-way possibilities.

DAIRY HIGHLIGHTS IN 1950

DAIRYING AND THE FARM BILL

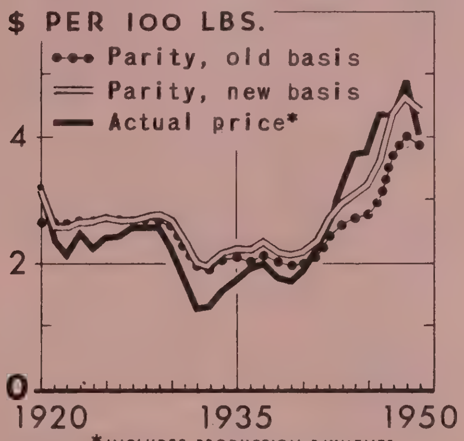
Support prices for 1950 will compare favorably with the 90 per cent support in effect this year. Latest reports from Washington say supports will be raised about 4 cents per 100 pounds on milk and lowered about 1 cent per pound on butter in the coming year.

Parity for milk gets two shots in the arm under the new law:

- Change of base period from 1910-14 to the latest 10 year moving average.

- The cost of hired labor is added in. At present prices this latter factor alone ups parity about 5 per cent.

MILK, WHOLESALE



USDA

*INCLUDES PRODUCTION PAYMENTS MADE DURING WORLD WAR II

WHY BREEDING RESULTS DIFFER

Good farming practices precede high breeding efficiency. A study of records for 87 farms in Ashland County, Ohio gives a measure of the effect of management practices on breeding. In the ten best herds 1.5 services per conception were required, compared to 3.18 services in the ten poorest. Here's how some management practices affected breeding:

	Services per Conception
BANGS DISEASE	
Bangs Free Herds	1.94
Bangs	2.6
HAY QUALITY FED	
Good Legume Hay	1.84
Poor Legume Hay	1.98
Good Timothy Hay	2.13
Poor Timothy Hay	2.41
SOIL PRODUCTIVITY OF FARMS	
Ten most productive soils	1.74
More productive soils	1.93
Less productive soils	2.18

MASTITIS

Seventeen herds with mastitis problems required .16 more services per conception than in the remaining 69 herds.

RECOMMENDATIONS FOR OBTAINING A GOOD BREEDING RECORD

1. Keep records of freshening date, heat dates, service dates and other observations. They help inseminator and veterinarian.

2. Turn cows out twice daily and watch for those in heat, especially 19 to 20 days after a previous period.

3. Do not breed cows until they are fresh at least 60 days.

4. Have a veterinarian check the genital organs of any cow that had trouble calving, that has been fresh 80 days and has not come in heat, and for cows that have cystic ovaries (always bulling). Early treatment for cystic ovaries is usually successful, but if treatment is delayed, permanent sterility often is the result.

5. Avoid service during the first 6 hours of heat. Cows first observed in heat in the morning must be bred the same day for good results. Cows first observed in the afternoon that definitely were not in heat in the morning should be bred the next forenoon. When phoning the inseminator tell him the time you first noticed the cow was in heat.

6. Dry cows off 60 days before calving.

THRIFTY CALVES NEED BACTERIA

At a recent mid-west nutrition conference it was recommended that the calves stomach be innoculated with bacteria by placing in its mouth, small pieces of a healthy cow's cud. Bacteria in the rumen (stomach) help pre-digest the food and manufacture some of the amino acids. A good amount of quality hay in the calf's ration relative to the grain has been found to increase the bacteria.

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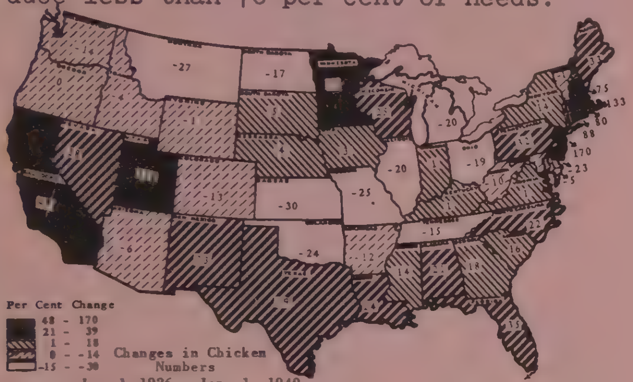
EGGS AND POULTRY TRENDS

CHANGES IN EGG PRODUCTION

There has been a decided shift in poultry production in the last 20 years. More eggs are now produced near the markets, less in the mid-west surplus areas. Biggest increases have been in North Atlantic and Southern states, but these areas still produce far less eggs than they use. Farmers in Florida, Louisiana, and Arizona produce less than 35 per cent of the eggs needed in their states to maintain the national average consumption. Other Southern states produce less than 70 per cent of needs.



Changes in Chicken Numbers
Jan. 1, 1926 - Jan. 1, 1949

Farmers are starting chicks earlier and feeding laying flocks better for more high priced eggs during the fall and early winter. In the late twenties, only 12 per cent of the year's eggs were produced in the October-December period. In 1947, production in this period amounted to 19 per cent of the year's total. The relative volume of eggs produced during this period has increased in all regions. Most rapid progress has been made in the Northeast and Lake States regions.

Changes In Consumption—Consumers use more eggs when their purchasing power is high. The all-time record consumption of 397 eggs per capita in 1947 compares with an average of 298 eggs for the 1935-39 period and a 328 average for 1940-44. A per capita consumption of 374 is expected for 1949.

Chicken meat consumption has shown no long time tendency to increase. However, a big increase occurred during World War II, when people turned to chicken because of the meat shortage.

CONTROL LICE AND MITES

Simplest and cheapest method is to mix dusting sulphur -- two pounds per 100 square feet -- in litter every three months. Mix some in nests too. (Alabama College)

1950 Egg Price Support set at 37 cents per dozen national average. Mid-west support expected to be between 26 and 28 cents, compared to 35 cents in 1949.

The new parity formula that goes into effect January 1 lowers the parity price of eggs 5 per cent. Parity for chickens and turkeys is raised about 5 per cent.

Long Time Effect— The use of a 10-year moving average to figure parity (as provided in the new law) is unfavorable for poultrymen. In the years 1940-44 the price of eggs, chickens and turkeys stood relatively high in comparison with the general level of prices received by farmers. Since 1946 they have been considerably lower. These favorable early years will be dropped out of the calculation one by one and replaced by relatively less favorable egg and poultry price years. This lowers the parity price base on which supports are figured.

NEWCASTLE PREVENTION

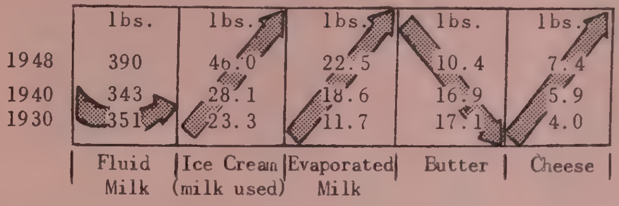
To keep Newcastle disease and other virus diseases from infecting your poultry, Purdue University recommends:

1. Keep visitors away from your birds.
2. Buy feed that is packed in clean and disinfected bags. Use good judgment when you have custom mixing done.
3. Insist that poultry buyers use clean and disinfected crates.
4. Buy only day-old chicks, and get them yourself wherever possible.
5. Don't bring back birds from shows.
6. Be extremely careful when you get cockerels for breeding.
7. Keep pets from visiting neighbors.
8. Keep your farm free of rats.
9. Do not buy used poultry equipment unless it is perfectly clean and has been disinfected.
10. Screen buildings to keep out free-flying birds such as sparrows.
11. If you've been around other poultry, change your clothes before caring for your flocks.
12. Dispose of dead birds quickly and sanitarily.

DAIRYING -- THE HEADACHE WILL PASS

THIS IS WHAT HAS HAPPENED --

U.S. Per Capita Production Of Dairy Products



	Fluid Milk	Ice Cream (milk used)	Evaporated Milk	Butter	Cheese
	lbs.	lbs.	lbs.	lbs.	lbs.
1948	390	46.0	22.5	10.4	7.4
1940	343	28.1	18.6	16.9	5.9
1930	351	23.3	11.7	17.1	4.0

More milk going into bottles, into cans, into ice cream and into cheese -- less milk into butter. This is the story of milk use over the past several years.

WHAT LIES AHEAD --

Today, a big part of the dairy industry is in the dumps -- the part that produces whole milk for cheese, and evaporated milk and cream for butter. The other part -- the market milk end -- is in pretty good shape.

What caused this trouble? Mostly too big inventories built up to supply exports to Europe -- exports that never materialized. ☞ RESULT: lower prices for evaporated milk and cheese and butter -- lower prices for milk used to make these products -- until warehouse inventories can be reduced some.

☞ BIGGEST HEADACHE is butter. Before the war we ate 17 pounds of butter per person per year. Last year we ate 10. The cause for this drop -- high prices relative to oleomargarine.

This trouble in butter may later backfire into the other dairy products for butter has been the shock absorber in the dairy industry. Until now, when there was a surplus of milk, butter would absorb it; when there was a shortage of milk, butter would be cut back. The loss of the balance wheel may be serious. Here is the outlook for the most important manufactured dairy products and milk:

CHEESE -- some drop in demand as exports drop, but U.S. market is growing.

CONDENSARY -- trend of consumption upward. Market should stabilize.

ICE CREAM -- trend upward. Sales will be cut when consumer income drops.

WHOLE MILK -- more babies, more consumers. Demand will stay high as long as people have money.

SMALL vs. LARGE DAIRY HERDS

A recent Louisiana study compared efficiency and profitableness of small, medium and large dairy herds. SMALL HERDS were considered as having less than 31 cows; MEDIUM SIZED HERDS as having 31 to 73 cows; and LARGE HERDS as having over 73 cows.

☞ "Large dairies made more efficient use of their labor and accomplished more per man, produced milk at the lowest cost and had the highest net return from the dairy enterprise and the highest labor income from the farm. They also had the highest return per hour of labor." Here are the results of the study.

LABOR EFFICIENCY -- Large dairy farms had 4.4 times as many cows as the small farms but only required 2.1 times as many hours of labor. The small herds required 126 hours of man labor per cow, the medium sized herds 85 hours, and the large herds 59 hours.

Labor, power and equipment cost ranged downward from $1.42 per hundred pounds of milk for the small herds to $.80 per hundred for the large herds.

FEED EFFICIENCY -- Feed cost per hundred pounds of milk produced was 31 cents more for the small herds than for the large herds.

COST -- Large herds produced milk for $1.11 less per hundred pounds than the small herds.

RETURNS -- Large herds had a net return over all costs of $1.05 per hundred pounds of milk produced -- small herds only $.45 per hundred pounds.

EDITOR'S NOTE: This study deals with a different type of dairy farming than reported last October from Wisconsin. Climate, feeding problems, markets are all different. The Wisconsin farms were organized as family units and cash costs were relatively low. The Louisiana farms studied were commercial units using hired labor.

DOANE AGRICULTURAL DIGEST APR., 1949

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WHAT IT TAKES TO MAKE BROILERS PAY

Many broiler growers make good profits -- at the same time others lose money. Yet they have available the same chicks, and the same feed and medicine.

In order to find those factors that determine profits, the Virginia Experiment Station kept records on 104 broiler operations. Average returns amounted to 31.7 cents per pound and the average cost of production was 31.5 cents per pound. The effect of the various factors were as follows:

☞ NUMBER OF BIRDS STARTED -- The cost of production decreased an average of 1.5 cents per pound for each increase of 1,000 birds per lot. The lowered cost of production was due largely to increased labor efficiency.

☞ FEED EFFICIENCY. An average of 4.4 pounds of feed was required to produce a pound of meat. Each additional 0.1 pound of feed required per pound of meat increased costs 0.45 of a cent per pound. (Feed at $4.50 a cwt.) There was no consistent relationship between the per cent of grain in the ration and feed efficiency. Birds allowed access to range used feed more efficiently than those that were confined.

☞ PER CENT MORTALITY. The average mortality was 10.3 per 100 birds started. Each additional bird lost per 100 started caused an average of 0.23 cents increase in the production cost per pound. Coccidiosis accounted for 35.4 per cent of all losses. Growers using sawdust litter had the heaviest losses.

☞ RATE OF GROWTH. Costs decreased rapidly as the rate of growth increased up to 2.5 pounds per 100 birds per day. The most profitable birds averaged 3.0 pounds at 12 weeks of age.

☞ LABOR EFFICIENCY. Labor requirements averaged 167 hours per 1,000 birds started. Each one-half hour reduction in daily labor requirements per 1,000 birds resulted in an average saving of 0.8 of a cent per pound produced.

Size of the lot started and the type of water supply were two important factors affecting labor efficiency. ☞ Each increase of 1,000 in the size of the lot netted an average decrease of an hour daily in the labor requirements per 1,000 birds. Automatic watering systems reduced labor requirements one-third or more compared to hand watering devices.

☞ AGE AND WEIGHT AT SALE. The most profitable age and weight at which to sell was tied very closely to the rate of growth. Fast maturing birds were very profitable when sold at 12 weeks or younger and weighing about 3.0 pounds. Slower maturing birds were more profitable when sold at 3.25 pounds.

CONCLUSIONS:

First: Size of business, feed efficiency, labor efficiency and rate of mortality were the four most important factors affecting costs and returns in the raising of broilers.

Second: A moderately large business must be maintained if the producer is to receive adequate returns. Hourly returns to labor averaged 17.7 cents on lots of less than 800, compared to 79.7 cents on lots over 2,800.

☞ A small broiler enterprise may make an important contribution to the family income of an off-farm worker and may fit in well as a supplemental farm enterprise, but a small broiler business will not pay large returns to labor.

NEW WAY OF WASHING EGGS

Some poultry ranches in California are using this method of cleaning eggs.

1. A piece of 1x2-inch wire fabric is rolled into a cylinder with a four-inch diameter and placed in the center of a wire gathering basket.

2. Eggs are placed around the cylinder to fill the basket two-thirds full.

3. The baskets of dirty eggs are then dipped into water at 160 degrees F. which contains a synthetic soap (detergent) such as Dreft, at the rate of a tablespoon per gallon of water.

4. The eggs are dipped for 30 seconds, set aside to drain, and then re-dipped.

5. A hose with a spray valve is inserted down the cylinder and the eggs rinsed with water of the same temperature.

6. The eggs are also washed from the outside.

CAUTION: Directions must be followed to the letter. Otherwise, don't try it.

MILK-FEED RATIO VERY PROFITABLE

Feed Grain Liberally -- but balance rations according to production. Compared with a year ago, 100 pounds of milk will buy 81 per cent more corn, 43 per cent more oats and 29 per cent more cottonseed meal. Here is a feeding table that should increase your profits.

Rate of Roughage Feeding	Feed 1 lb. grain for each 2½ lbs. milk produced above these amounts		Feed 1 lb. grain for each 2 lbs. milk produced above these amounts	
	Holsteins	Brown Swiss Ayrshires	Guernseys	Jerseys
Heavy*	20	18	15	12
Medium**	12	10	8	6
Light***	0	0	0	0

*Heavy roughage feeding is 2½ pounds good hay equivalent per 100 pounds body weight — all the good hay, silage, or both cows will eat.

**Medium roughage feeding is 2 pounds good hay equivalent per 100 pounds body weight—all the fair hay and silage or both cows will eat, or poor hay.

***Light roughage feeding is 1½ pounds good hay equivalent per 100 pounds body weight — all poor hay or poor hay and little or no good silage, corn stover, straw, bean pods — or all poor hay crop silage.

Use home grown grains whenever possible. "A 16 per cent protein grain mixture can be made from four parts (by weight) home grown grain and one part 32 per cent mixing feed, or 2 parts home grown grain and one part 24 per cent dairy feed, or equal parts home grown grain and 20 per cent dairy feed." (Cornell College of Agriculture). Feed corn-and-cob meal -- it is as valuable pound for pound as ground shelled corn unless the grain ration is already bulky.

Butter VS Margarine -- This controversy will make an early reappearance in Washington. The November election apparently assures the repeal of the margarine tax.

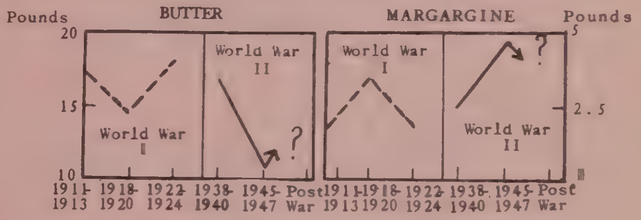
A factor of much greater importance is what is to happen to the market for the higher priced dairy products -- fluid milk, cream, cheese, ice cream. Although population has increased and cow numbers are down, milk consumption will slump if consumer incomes decline.

The civilian consumption of fluid milk and cream increased 24 per cent from the 1938-40 level to 1946. For cheese the increase was 17 per cent and for ice cream the jump was 116 per cent. People have been educated to the use of these nutritous products and will continue to buy them in large amounts as long as they have the money.

Butter is generally considered to be the marginal product of the dairy industry. It is produced from milk that has no other outlet. The dairy industry would be ahead if all milk could be sold through the high price outlets and none used for butter. Dairymen who have changed their market -- from butter to fluid milk -- during the war should improve the quality of their product. It will help to hold this most profitable market.

If consumer incomes slacken, less high priced dairy products will be used, more will go into butter. The resulting lower butter prices will mean that people will eat more butter -- less margarine. That was what happened following World War I.

PER CAPITA CONSUMPTION DURING
TWO WAR PERIODS



Margarine has undergone considerable improvement since 1920 and butter may not be able to recover as much of the market as it did following World War I. But, butter is still a preferred product. Consumers will buy butter in preference to margarine when prices are in line.

CALFHOOD VACCINATION DOES NOT GIVE PERMANENT PROTECTION

"It is impossible to predict from a Bang's test given after vaccination whether an animal will abort or calve normally after being exposed to the disease." This is the conclusion of a study made at the University of Wisconsin. In the investigation it was noted "that for about 50 per cent of the animals the protection given by calfhood vaccination (Strain 19) does not persist into the third gestation period. It does help protect cattle during their early years, as shown by extensive research as well as by the experiences of thousands of farmers."

DOANE AGRICULTURAL DIGEST JAN., 1949

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MILK-FEED RATIO VERY PROFITABLE

TWIN CALVES A LIABILITY

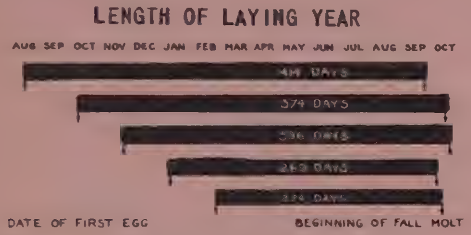
A 15-year study of multiple-births in the New Jersey Experiment Station herd reveals the following disadvantages:

1. Shorter gestation period.
2. Greater difficulty and complication for the cow at calving time and more trouble with retained afterbirth.
3. Higher death rate at birth.
4. Lowered vitality throughout life as compared with single calves.
5. Lowered breeding efficiency and increased sterility of the cow.

Efforts should be made to reduce its occurrence by discriminating against cow families in which twinning has occurred.

EARLY PULLETS FOR PROFITS

The first step in a well planned and properly managed laying flock is the purchase of early chicks. Early pullets lay more eggs and the eggs sell at a higher price.

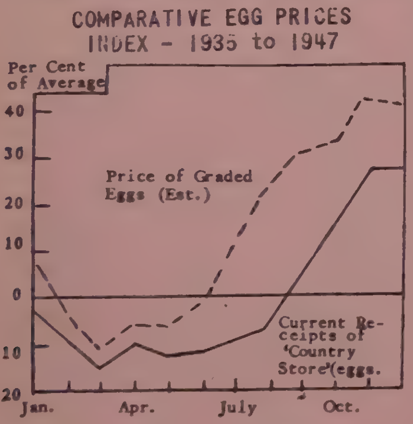


Length of laying year in relation to date of first egg. Birds are grouped according to date of first egg, in 50-day periods.

Take delivery of chicks a month to six weeks ahead of the February 20 to March 15 deadline suggested in Digest Page 253. IF --

☞ 1. If you have adequate housing
☞ 2. If you can get chicks from a high producing strain that does not take a fall or "pullet" molt.

Producing eggs for the high priced fall market has a double advantage if a "graded market" outlet is available.



From August through November quality eggs sold on a graded market command a premium of 25 per cent and up, compared to current receipts or the "country store price".

The dollar value of early pullets compared to late pullets has not been fully established. However, by a conservative estimate, the advantage for an early pullet flock of 500 birds over a late flock is more than $200 based on present price levels.

HATCHERIES TO WORK AT CAPACITY

It seems like everyone wants to get back into poultry. Compared with a year ago the August and September hatches were each up 21 per cent; up 17 per cent in October and up 61 per cent in November. On December 1, 80 per cent more eggs were in the incubator and orders for January chicks were 122 per cent larger than on December 1, 1947. In the fall, hatching eggs were short but the supply is now ample for the strong demand. This increased output is expected to continue through the early part of this year. The United States Department of Agriculture expects a 15 per cent increase in the number of chickens raised next spring and a 15 per cent increase in turkeys.

This suggests another reason for early pullets in 1949. Egg production will be very heavy next fall if nothing happens. Farmers who get their pullets into production during July and August may be able to take their profits and sell out in January if prices go too low after the supports expire on December 31. Farmers who get started late will have about the same costs but may have no profits to take out.

MECHANIZATION OF POULTRY PRODUCTION

Most of us still produce eggs in the "old fashioned way" that we learned from our grandmothers years ago. These methods may soon be as out of date as grandad's old walking cultivator and his single shovel plow.

Electrical devices have already been devised that will feed the hens, gather the eggs and load the manure. Pennsylvania State and Purdue University are working on an endless chain type of self feeder that they say may make it possible for one man to handle 50,000 broilers at a time compared to 10 to 20 thousand today. Some of the same principles can be applied to farm and commercial laying flocks.

THIRTY COWS FOR EFFICIENCY

Thirty-cow herds are the most efficient -- more efficient than large herds of 100 cows -- more efficient than small herds. That is what a recent study of 120 Wisconsin dairy farms showed.

For large herds efficiency decreases because: "Extra time required in moving the feed and milk greater distances in the large barns and in taking the cows greater distances to and from fields offsets any time savings at other jobs such as washing milkers and cans and throwing down silage. Farmers with herds of 100 cows or more have additional labor supervision problems and their disease control problems appear to be greater than in the smaller herds.

"Several of these large operators pointed out that higher labor costs in recent years have made it more profitable to break large herds up into units of around 30 cows on separate farmsteads with one family on a share basis and a minimum of hired help caring for each herd separately."

For all herds studied, the average time for milking was 51 man hours per cow per year. But, in the smaller herd (10-19 cows) the chore labor, in addition to milking, was 69 hours per cow, compared to 65 hours per cow in herds of about 30 cows. Similar studies made in New York State show the herd averaging about 30 cows to be more efficient and return a much larger labor income than the smaller herds.

The study then gives the following suggestions for producing milk at maximum efficiency:

1 ☞ "Use the rapid milking technique developed in recent years, including mechanical stripping. (Digest Page 281)

2 ☞ "Use two single mechanical milking units per person unless the workers cannot maintain a rapid milking schedule with two units.

3 ☞ "Rotate dairy chores among members of the farm working force if desirable, but have extra helpers do other chores rather than help milk.

4 ☞ "Provide good pasture as many days as possible during the year. The dairy herd requires almost twice the labor when barn fed as when on pasture.

5 ☞ "Arrange feeding alleys and size of feeding carts to make one round trip when feeding the cows, rather than doubling back with the empty container for additional feed.

☞ "A center driveway barn will reduce labor three hours per cow per year, and a barn cleaner will reduce labor five hours per cow, as compared with using a litter carrier. *(Labor saved must be worth $1.50 an hour to make installation of a barn cleaner profitable for a 20 to 25 cow dairy herd.)*

7 ☞ "Use adapted DDT fly spray on the cows and in the buildings a few times during the season and save spraying cows twice daily with old types of spray materials."

DAIRYMEN ARE LOSING THE FIGHT

Throughout the Corn Belt soybeans are growing on land once used for pasture and hay, and barns are housing cobwebs and machinery instead of cows.

While creamery operators were stopping nearly half their churns, margarine manufacturers more than tripled their output. Butter consumption in the past 15 years has dropped from about 18 pounds per person per year to about 9 pounds. During this same period, margarine consumption has jumped from about 2 pounds per person to 7 pounds.

HYPERKERATOSIS (X DISEASE) OF CATTLE

This disease was first reported in New York in 1941. Since then occasional cases have been reported from a widespread area. It is thought to be a nutritional disease, but as yet very little is known about its prevention, transmission or cure.

The disease is most likely to occur in late winter or spring. The symptoms:

Watery discharge from the eyes and nose.

Loss of condition and poor appetite -- and unresponsiveness.

Thickening of the skin, starting at the withers. A loss of hair and a dry, deeply creased skin may also result.

Diarrhea is common in the latter stage.

Delayed pregnancies of one to four weeks -- the udders do not develop and the pelvic ligaments fail to relax.

BACTERIA COUNT HIGH ?

PUT EACH CAN IN THE COOLER AS SOON AS IT IS FILLED. With ideal conditions, some bacteria double in number every 20 minutes. By waiting until milking is completed (assume 40 minutes) the first can will have 4 times as many bacteria as when first filled. If it takes an hour, the bacteria will have increased 8 times.

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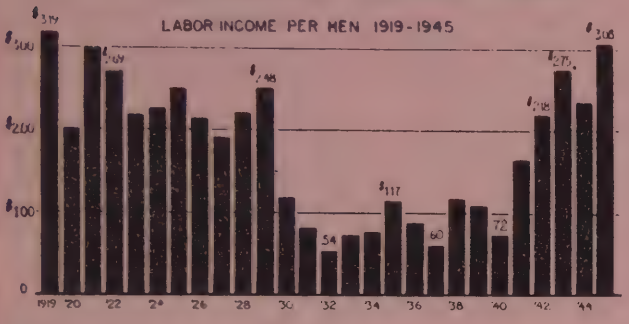
A DEPENDABLE SOURCE OF INCOME

Poultry is in a strong position and can be depended upon to return a fair labor income for the good operator even through a period of low prices.

Poultrymen did -- and will -- weather the (next) depression in better shape than most farmers.

The Hen Is Dependable As a Source of Income



MISSOURI COLLEGE OF AGRICULTURE

The graph shows that the average hen returned a labor income of $1.45 per year over a period of 27 years. It ranged from a low of $.54 in 1932 to $3.19 in 1919. (Labor income is the amount left after the cost of feed, replacement stock, equipment, taxes and interest has been paid).

If you have kept good records, check your returns per bird with these figures or check for relative yearly changes. Check them to assure efficient production at low cost.

ARTIFICIAL LIGHTING FOR MORE EGGS

"Both natural and artificial light stimulate egg production. Most practical breeders know this from experience. Few persons realize, however, that light produces this effect by stimulating a tiny gland -- the pituitary -- which is located at the base of the brain. The common notion is that increased light lengthens the feeding time and thereby increases egg production. Research has shown that if concentrated feeds and sufficient light are provided, a hen can eat enough in as little feeding time as one hour a day to keep producing at top speed." Illinois College.

For maximum production during the months of high egg prices you will have to stimulate your chickens with lights.

→Turn on the lights so the birds have 14 hours of total light.
→Use a 40-watt lamp for each 200 square feet.
→Use reflectors on the lights.
→Hang them about halfway between the front edge of the dropping boards or roosts and the front wall, and six feet from the floor.

Some poultrymen have used lights all night. It results in more total eggs but a larger decrease in the spring lay.

Poultry Flock Size is an important factor in determining profits. Farmers find, and cost account records prove, that flocks should be either large or small. Either have enough chickens, preferably 500 or more, so that the poultry is run as an important enterprise; or have only enough for home use.

OPTIMISTIC POULTRY FUTURE

Output of chicks by commercial hatcheries for August was up 31 per cent over August 1947 and up 11 per cent over the average for the month. The number of eggs in incubators on September 1 was reported to be 40 per cent larger than September 1, 1947, and chicks booked for October delivery are considerably greater than last year.

Push Turkeys For Early Marketing -- fryers and broilers from the late hatchings will be competing at the markets by November.

Turkey Numbers are still low -- heavy summer hatchings, however, have increased numbers so that now they are only 10 per cent below last year rather than 18 per cent as reported earlier. Storage stocks are very low and prices will be good -- especially for early birds. Growers expect to market 23 per cent of them in October or earlier, 39 per cent in November, 29 per cent in December and 9 per cent in January or later.

SELECTING TURKEYS FOR BREEDING IMPROVEMENT

Be systematic -- do a quick, good job and handle birds carefully.

Handle each bird individually -- and systematically so that no part is overlooked. Discard all birds with abnormalities or that are under weight. Check the birds for a reasonably wide and flat back, a straight keel without any knobs or dents, normal wings, hocks that are neither puffed nor enlarged, and a BROAD BREAST. If you are not sure the bird is broad breasted -- measure. To qualify as "broad breasted" a bird must have a breast 3 1/2 inches wide, 1 3/4 inches above the keel.

Turkeys can be handled with a minimum of effort at waist height and their defects can be noticed more quickly at this height. Either run them up a chute to an elevated catching platform or dig a pit at the side of the catching chute. If the bird is caught by both shanks, be careful that the breast does not drop hard. Place the bird on the ground before releasing it.

LOOSE-RUN BARN VS. STANCHION BARN

Dairymen have long argued over the relative merits and demerits of the stanchion system versus the loose-housing system in dairy cattle management. Many of the arguments for and against the two systems could not be based on actual facts and figures. Comparative tests had not been made.

During and immediately following the war, dairymen, finding labor, feed, equipment, etc. much costlier than ever before, began requesting information on ways and means of lowering production costs and upping management efficiency.

In line with these requests the University of Wisconsin set up comparative tests to check the performance of a herd of dairy cows housed in an insulated stanchion barn with a herd housed in an open, cold, loose-run barn. A small milking parlor was used in conjunction with the loose housing system. The comparative results of the two herds during the past three years are shown in the following table. Most of the comparisons are on the basis of the conditions in the stanchion barn being 100 per cent.

	Stanchion Barn	Loose-run Barn
1. Temperature (29.04°F outside)	53.52°F	37.13°F
2. Humidity (72.95% outside)	82.02%	78.04%
3. Manure Pack Temperature-av. 3" from surface		84.33°F
4. Stall Barn Floor Temperature-average	57.7°F	
5. Labor Comparisons ...		
A. Actual summary of each time study	100%	82.0%
B. Actual time for cleaning loose-run barn loafing area, mechanically	100.0%	83.7%
C. Actual time for cleaning loose-run barn loafing area by hand	100.0%	91.9%
6. Feed Consumed (Cow-day basis)		
A. Silage	100.0%	104.18%
B. Hay	100.0%	103.65%
C. Concentrates	100.0%	100.75%
D. Total digestible nutrients	100.0%	102.83%
7. Bacterial Counts		
A. Arithmetic average on pooled raw milk	5,724	8,364
B. Arithmetic average-counts on pasteurized samples of pooled milk	177	135
8. Bedding (Cow-day basis)	100.0%	166.33%
9. Milk Production (4% fat basis)		
A. On a total cow-day basis		
Pounds per day	29.42	31.32
Per cent fat	3.55	3.66
Per cent of stanchion barn record	100.0	106.46
B. On a milking cow basis		
Pounds per day	34.60	35.74
Per cent of stanchion barn record	100.0	103.29
C. Pounds nutrients per pound milk (4%) produced	100.00%	96.60%
D. Cost per pound milk (4%) produced with conc. at $60; hay at $20; silage at 1/3 hay cost	100.0%	96.11%
10. Cow Weights-Av. gain per cow per test period	6 lbs.	34 lbs.
11. Calves		
A. Gain per calf per day	100.0%	88.14%
B. Lbs. nutrients consumed per lb. gain	100.0%	85.71%
C. Lbs. bedding per calf day	100.0%	73.39%

SOURCE -- UNIVERSITY OF WISCONSIN

ADVANTAGES of Loose-Run Barn

- Less humidity in barn
- Less labor required to handle same number of cows.
- Feed consumption per cow was increased on both grain and roughages.
- Increase in milk production -- both on a total cow-day basis and on a milking cow basis. Increase in production probably due to increase in feed consumption.
- Apparent increase in feed efficiency -- took less pounds of feed to produce a pound of milk.
- Less feed cost per pound of milk produced.

DISADVANTAGES of Loose-Run Barn

- Bacterial count on raw milk was higher. (New York data, however, shows that cleaner milk can be produced in a loose-housing setup.)
- Requires more bedding -- Actually an advantage because the increase in amount of manure saved will have more value than cost of the increased amount of straw.

OTHER ADVANTAGES of the loose-housing or loafing barns not shown in the table include: (1) general improvement in herd health -- less udder injuries, less sore and swollen knees and hocks, (2) the building cost of a loafing barn is much less than that of conventional dairy barns -- whether building a new barn or converting existing buildings, and (3) the loose-housing system is flexible. The number of cows can be increased without any great expense. It affords the greatest possible fire safety for the herd.

Here are some brief suggestions by the University of Wisconsin for dairymen who are interested in adapting their buildings for a loose-housing system. Such a system is usually thought of in terms of 4 separate units -- the milking parlor, an open air barnyard, the feeding area, and the bedding area. On most farms the latter two are combined into one building called the loafing barn.

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LOOSE RUN BARN VS. STANCHION BARN

The Loafing Barn should be large enough to allow a minimum of 80-90 square feet per cow. Be sure the loafing area is extra large to allow for future herd expansions. Keep the ceilings at least 9 to 10 feet high to permit use of a power manure loader. Doorways should be at least 10 feet wide and conveniently placed to help aid in barn cleaning.

Keep the feeding area and the bedded area separated as much as possible to prevent excessive trampling of the bedded area. Hay, silage, and bedding should be conveniently located where it will be needed.

Use the open door policy between loafing barn and open barn lot. This will provide all the ventilation necessary and will likewise help lower the humidity of the barn.

The Barn Lot should be paved -- at least the most-used portions. Allow 100 square feet per cow. For areas not paved a well packed base of crushed stone or other material will be satisfactory. Drainage for this lot is important -- a fall of one foot in 100 feet is adequate. Drainage should be away from the buildings. Where possible it is best to have the barn lot protected from the north and west.

The Milking Parlor should be located as near the loafing barn as possible and on a well drained site. Use of an elevated stall arrangement will enable the operator to handle more cows in less time than the old conventional stanchion type parlor. It will eliminate stooping and squatting to put on milkers. Install a pipeline milker to take milk directly from the cow to the can.

THE POULTRY SITUATION

BROILER INDUSTRY OUTLOOK

The broiler industry appears doomed to widely fluctuating prices -- unless facilities for freezing and eviscerating are developed on a large scale. Mr. Roy Lennartson of the USDA's poultry branch has this to say. "Broilers come to market in big waves. If you only have facilities to ice pack, it's difficult to keep ahead of price declines.

"So long as our facilities are those for preparing ice-packed birds, the problem of widely fluctuating prices will be with us. What we need are facilities for freezing, storing, eviscerating, and packaging in many ways."

An analysis of a recent study by the Production and Marketing Administration indicates that the broiler industry is just beginning to grow -- if the distribution of broilers to be consumed can be evened out and prices stabilized. The study indicates that by 1960 broilers may supply 41 per cent of the total poultry meat consumption, outstripping young farm chickens and farm hens.

Increased competition among producers will develop with this growth of the industry. Whether producers in certain localities survive increasing competition will depend upon certain essential factors:

1. Gearing of marketing to consumer demand -- mainly through production planning on the farm and regulating marketing of the processed product to avoid market gluts.

2. Expanding markets -- taking advantage of new market outlets.

3. Increased efficiency and lower production costs -- from the hatcherymen down through the producer and processor.

Potential Layers — 4 per cent more than were on hand a year ago, but 6 per cent below 1943-47 average.

All regions of the country have shown increases. This means that more eggs will be produced during the coming months, with lower egg prices next winter and spring. Also the government will continue to be a big customer on the market -- holding the price at support levels (now 35 cents a dozen at midwest points for shell eggs).

Turkey Prices -- It will be fortunate if large numbers of the birds do not sell at government price support levels or lower. Supports have been used very little so far and government officials now believe that support activities may not be as large as at first expected. They may be too optimistic in saying that government buying will be limited to some relatively small operations at the start of the marketing season.

The USDA's revision in the size of the present crop has given quite a bullish undertone to the turkey outlook.

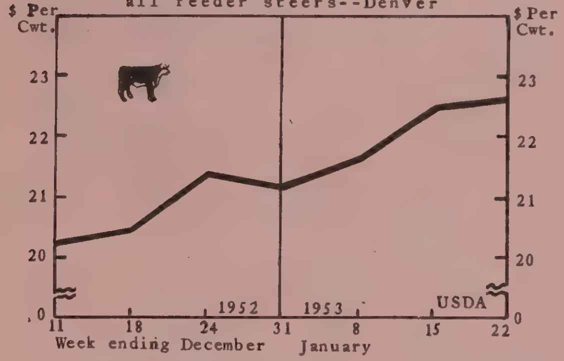
RANCH AND LIVESTOCK MANAGEMENT

CATTLE, CATTLE, CATTLE, -- More clients are asking about cattle than any other livestock or crops. The main questions relate to outlook.

FEEDERS & STOCKERS

Present marketings are light on most markets and demand is also small. Spring will bring a pickup in transactions. Our Denver office reports some spring contracts on short yearling steers at 25-27¢. Asking prices are up to 28¢ and 30¢; not much activity yet.

WEEKLY AVERAGE PRICE,
all feeder steers--Denver



Main demand will be for running on grass. Graph shows the upward trend in Denver. By mid-January, "Good" stocker steers at Ft. Worth sold for $19-23, up noticeably from December. However ranges are in poor condition and restocking will be slow.

Break in fat cattle prices means that demand for feeders is slow at this time. Kansas City receipts in week ending Jan. 22 were 27 per cent stockers and feeders and prices sagged $1-2 per cwt.

→ General trend of prices will be up until early summer, but will not nearly reach 1952 levels. ☞ BEWARE of fall market for grass cattle. All cattle numbers on January 1 were estimated at 93 million head -- a new record. Cattle on feed were at a record high.

Beef slaughter this year can easily run 15 per cent above last year, more if pasture conditions are poor. We expect prices to go at least as low as the bottom reached last fall.

FED CATTLE

Most pressure has been on the price of "Good" grade cattle. This will continue for another 60-90 days, at least. Most "Choice" grade can be expected to drop further. "Prime" cattle are rather scarce and the price should remain nearly steady. Lower grades of steers will see some price improvement from now until late spring.

Cattle On Feed on January 1 numbered 16 per cent more than last year. Nearly one-half of them were in Illinois, Iowa, and Nebraska, where numbers were 30 per cent above 1952. Farmers had more light cattle than usual indicating that fed cattle marketings will be scattered through the summer and fall.

SMALLER PIG CROP is good news. It will mean 15 per cent less pork competing with beef next fall. Also some beef cow herds in the Corn Belt are being liquidated -- less competition for the western producer.

COWS

Drop in cow prices relieves some of the competition from cull dairy cows since dairymen tend to keep them. Recently slaughter cow prices have been very irregular but strength will come as grass approaches. Spring will be the best time to sell any cows that you do no want to keep for a couple of years.

Experienced Ranchers like Burton B. Brewster of Birney, Wyoming, expressed grave concern over western range conditions at Range Manager's meeting in Albuquerque. He has operated his ranch through two previous periods of dry weather.

Short grass springs followed by dry falls severely weaken range plants. Brewster stressed keeping herd size flexible to meet variance in range forage. Forced disposal is least painful if on a yearling steer marketing basis. This is not a year to stock pastures to the limit.

WHEAT SITUATION

Sharp reduction in exports has hurt wheat prices. The world supply promises to be big and U.S. carry-over may reach 600 million bushels. The market has discounted these factors heavily.

Huge amounts of wheat are under government loan. Lack of "free wheat" and the poor winter crop should lend some strength to prices by early summer.

International Wheat Agreement will probably be renewed due to congressional pressure. U.S. and Canada will try for a higher price to reduce the $180 million annual subsidy that our government has been paying.

Wool Prices have shown strength during January. If you can get more than support price, better sell now. If not, you have until March 31st to get a loan on 1952 clip. The 1953 clip will be supported at 90 per cent of March 15 parity -- nearly the same as last year.

QUARTERLY RELEASE

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RANCH AND LIVESTOCK MANAGEMENT

LATE REPORTS FROM THE WEST

SOUTH DAKOTA -- Cattle mostly in good shape. Little snow on range. Enough hay or grain sorghum to meet needs. Big worry is lack of moisture for spring -- 4 inch cracks in ground.

MONTANA -- Hay selling for $30-33 per ton, has been higher. Price will go down more unless heavy snows come in February and March. Will take lots of extra moisture to provide normal grass growth in spring. Left-over hay may be needed to supplement range.

IDAHO -- Plenty of potatoes still held in farm cellars. → Plan to move them out before the big early crop pushes prices down. No surplus of milk around Moscow and Spokane.

WASHINGTON -- State College specialists suggest: Plant the same or a smaller potato acreage. Emphasize beets, beans, and "high-powered" pastures. Beets will become more favorable compared to other crops -- get your beet production established with refineries this year.

Broilers should be finished to 2.9 pounds with feed at $100 per ton and broilers at 28 cents. Corn is cheapest feed grain at present with Canadian oats next.

DENVER -- Saw a fine bunch of bulls that sold for $700--stockmen say they would have brought $1100 last year. Stockmen say too many breeding bulls were brought to the sale--over 3,000 head. Cattlemen still expect to stay in business and make some money; some are even optimistic.

Cottonseed meal priced about $108 per ton, soybean meal about $102 and linseed meal at $115. Soybean meal seems best buy. Native hay priced at $20 per ton -- stacked alfalfa at $25-27 north of Denver. Dehydrated alfalfa meal is bringing $4 per cwt. You cannot afford to risk Vitamin A deficiencies in cattle with alfalfa and meal at these prices.

NEW MEXICO -- Mid-January meeting of Ranch Managers at Albuquerque highly successful. A practical working group of ranchers and professional men. Ranchers there, emphasized conservative use of ranges in the year ahead.

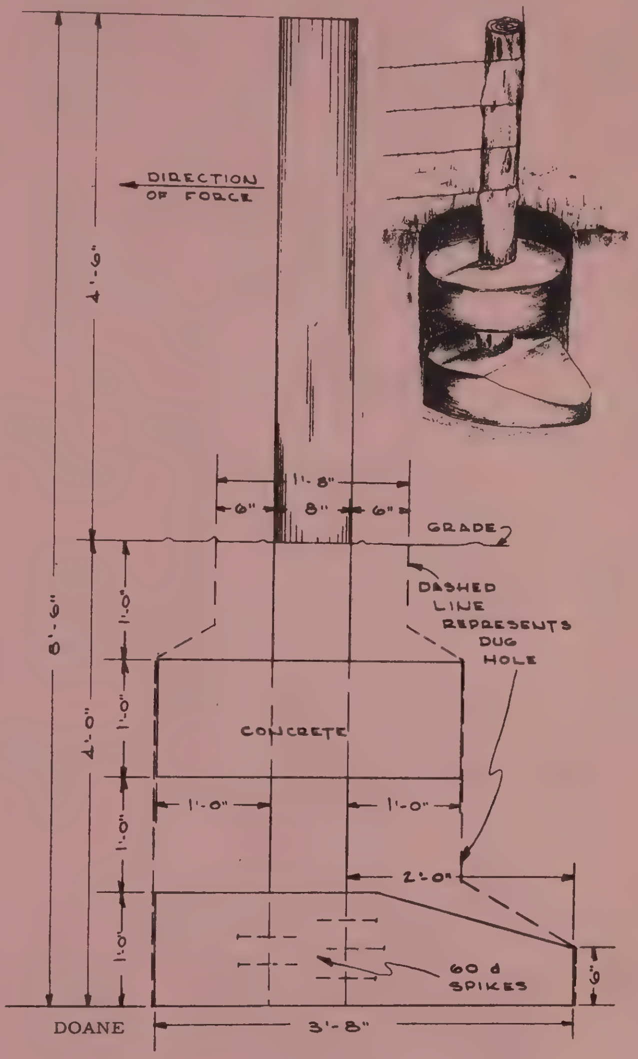
WEST TEXAS -- More moisture needed to maintain small grain acreages, some of which is just now coming up or being planted (Jan. 15). Heavy supplemental feeding is being carried out.

CALIFORNIA -- Warm, wet weather has helped grains and range grasses, as well as citrus crops. Alfalfa hay, #1 grade, is priced at $35 per ton at L. A. and $24 in North Bay area (Jan. 15). Oil meals in good supply with cottonseed meal at $93 and soybean meal at $98, wholesale, San Francisco.

Imports of Mexican and New Zealand beef are hurting coast markets. Mexican government has said 400,000 head of cattle can be exported in 1953. Most will come to the U.S. The Canadian border will open on March 1.

RIGID CORNER POSTS

A corner post arrangement which will last, has been designed by D. Howard Doane on his Grassland Farm in Central Missouri. So far it promises to be more sturdy than any method of bracing he has tried.



Corner Fence Post Set In Concrete

A pressure-treated 8-inch post is set in two pieces of concrete as shown above. The bottom section extends out to the side opposite the pulling force. After dirt is tamped in solidly, this extension keeps the post from moving.

After the lower section of concrete has been poured, it can be covered immediately with building paper and dirt. Then the top section can be poured without delay. The concrete should set before wires are tightened. While not the cheapest way to set a corner post, it is one of the most permanent.

Wooden posts should be treated with a preservative. For a booklet on farm treatment of posts, write Univ. of Ill. (Urbana). Request Circ. 636, "Preserve your Posts with Penta".

Special Message To —
THE WEST

"What about prices?" "What about controls?" Ever since the Korean War broke last June, these questions have been in the minds of farmers and consumers.

A western rancher phoned long distance today -- "What about wool -- should I sell at $1.20 a pound?" Back of his and many similar requests is the question of controls.

Controls may be on livestock prices by the time you read this. No one knows -- not even the people working close to the top brass in Washington. The following conclusions are supported by the judgments of many executives and others with whom we work -- as well as by the reports from our Washington staff

- A long time will pass before controls are made to work. On meat animals, controls will be very ineffective.
- No solid price-line will be held. There will be adjustments -- and always UP.
- Any roll-backs in prices will be especially open to attack. Do not sell on the assumption that a roll-back price will be held.
- Black markets are already operating in industry and will come quickly to meat if controls return.
- Subsidies will be one method that will be used to give price increases to producers.
- Public support will be weak as long as the Nation is not in all-out war. Those who dodge controls will not be severely condemned by neighbors and friends.

Premiums Will Be Cut on quality if ceilings return. Controls have a leveling effect. Common grades will often sell at or near the top price.

☞ Feeding for top finish will not be profitable in most cases. This will be especially true for sheep and cattle.

☞ Quantity output of meat at low cost will be the most profitable procedure -- in contrast to quality.

☞ Less variation in price from one season to another can be expected. Normal seasonal price changes will be largely wiped out. There will be little premium for marketing in the off seasons. Prices will not be allowed to move up and reward those who sell when meat is most scarce.

Direct sales, to get as near retail prices as possible, will often be good business. Private lockers are already reported full of meat, and under controls, every effort will be made to buy direct and in quantity.

Adjust Your Livestock programs to a controlled economy. Be ready if and when controls are put on meats and feeds.

Buy lower grade steers to graze -- but get good doers that will make rapid gains.

Rely more on grass fat finish in selling to slaughter markets, and be slow to feed for high finish.

Do more short-term feeding on the ranch. This is apt to be more profitable than selling steers and lambs as feeders. Just put them in good shape. Don't try to get them fat.

☞ Make quantity production -- in contrast to quality, your goal. For example, by shifting to the selling of yearling cattle instead of calves, the meat output on many ranches can be stepped up.

NATIONAL PUSH FOR GRASS

More competition for the West is in the 1951 grassland program now under way. It was jointly announced November 16 by Charles F. Brannan, Secretary of Agriculture and John A. Hannah, Chairman of the Land Grant College Association.

It is a drive to get heavy applications of fertilizer and other grass improvement methods put into effect starting this year. The program will get bigger and bigger with each succeeding year. On many farms it will double the capacity of pasture land -- in some cases it will increase the carrying capacity 5 to 10 times.

MESQUITE control with sprays continues to show encouraging results at the Spur, Texas Agricultural Experiment Sub-station. Much larger scale tests were made last year with airplane application.

RICE LAND grazing with improved pasture has increased cattle gains per acre about four times in Texas experiments.

HIGHER TAXES will induce more land owners to improve their grazing lands with fertilizer. May mean less emphasis on terracing and earth tanks (ponds) which cannot be deducted in figuring income taxes for the current year.

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WIN OR LOSE

Consumers as well as livestock producers are deeply indebted to the American Meat Institute, other meat packer associations, and to the farm and livestock organizations for the vigorous and clear cut way in which facts have been presented to ESA and others in an effort to keep damaging controls from being imposed.

Here is a summary you can use in discussing the matter with your congressmen and others.

To summarize—

1. The meat price situation is not as critical as it has been made to appear.
2. Those who believe meat price controls are desirable should remember the terrific complexity of the livestock and meat industry and the very great difficulty of imposing any controls which will not break down, as did controls under OPA.
3. There is no shortage of meat. Total meat production in 1951 will set a new peacetime high
4. Production is increasing and could be increased 12% over the next two years, and 25-30% over the next three to five years.
5. The question of meat prices, therefore, is a question of the value of the dollar.
6. Consumers' expenditures for meat rise when their incomes rise.
7. It is not asking too much of our fiscal and monetary authorities to limit inflation of consumers' incomes to 10% in the next two years and 20% over the next three to five years. If this is done, meat prices can be stabilized.
8. **This program seems a clear choice over a program of price control that cannot control prices or rationing that cannot assure everyone a fair share of meat.**
9. Both supply and demand are constantly changing in the meat industry.
10. Meat is perishable and impossible to define accurately in terms of grade, fat, trim, tenderness, content of bone, etc. These are just as important as the price in determining what the consumer gets for his money.
11. No one controls the supply of livestock coming to market.
12. Meat can be processed in many different ways.
13. Meat shortage areas are created by small errors in any pattern of fixed prices.
14. Meat can reach the consumer through either few or many channels of trade.
15. Thousands of business units are engaged in meat packing, and thousands more could begin operations almost overnight.
16. The Defense Production Act of 1950, Title IV, Section 402 (2) (iv) requires that a ceiling may be established with respect to an individual material or service only when the President finds that **"it is practicable and feasible to impose such ceiling."**
17. Our previous experience convinces us that because of the complexities of the meat packing industry, controls are not practicable or feasible.
18. Any controls on meat would have to be complex.
19. Complex controls cannot be enforced.
20. During OPA a slaughterer of beef had to be familiar with over a hundred regulations.
21. One cut of beef required over 600 words to define, and it would take an expert in both anatomy and geometry to understand the definition. Most butchers are too busy to study these subjects.
22. Slaughter controls will not prevent black markets.
23. Subsidies are not effective as a policeman.
24. Meat rationing is unavoidable with price controls.
25. Rationing without price control is impracticable.
26. There is no shortage of experienced black marketeers.
27. Unenforceable controls breed contempt for law.
28. The sound course is to attack inflation at its source—
    a. Limit the money demand for meat by preserving the value of the dollar. This can be done by vigorous following of the administration's program of indirect controls.

    b. Encourage a further increase in our current high level of meat production by—

1. Inducing farmers and ranchers to carry more livestock on pastures and ranges.
2. Greater feed production through improved practices, new varieties of seed, more fertilizer.
3. Increased efficiency in feeding livestock. It is not at all improbable that over a period of two years we could increase meat supplies 10-12 per cent and in three to five years 25-30 per cent.

We will be glad to send single copies of this page to others, if your will send names and addresses to us.

Special Message To
THE WEST

Scared Money is being spent freely on land, cattle and sheep -- flight of the dollar. The reports come in from all sections of the country.

There will be losses and long time repercussions. Even sound operations will feel the jolt if meat production piles up too fast.

Business magazines and investment advisors talk about the plight of fixed dollar assets -- and always point to farms, ranches, and livestock as one way out. The memory of big war-time profits made by some ranchers and farmers is fresh in the minds of professional men and others seeking profits and security.

Novices venturing into the complicated field of agriculture are creating problems now and for the future.

Taxes Are High per $100 full valuation of real estate in the western states -- compared with the national average.

Mountain states -- $1.38
Pacific states -- $1.57
United States -- $1.10

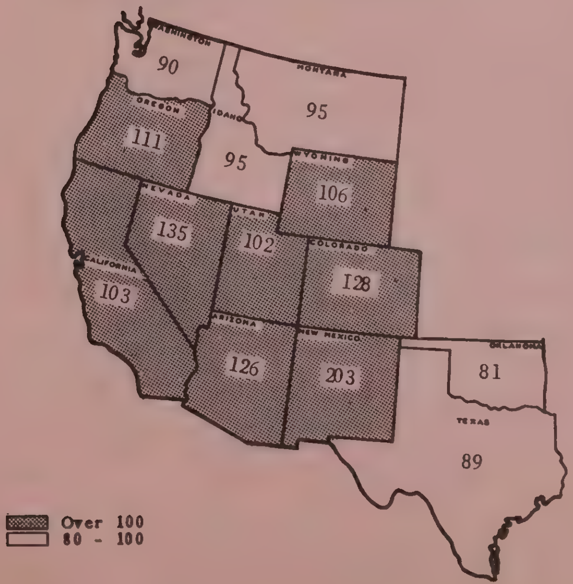
The increase has been very rapid. Taxes are up since four years ago by --

Mountain states -- 35¢
Pacific states -- 75¢
United States -- 20¢

These are record high taxes.

Farm Debts Up -- The mortgage debt is now above that of 1940 in most of the ranch states.

1950 TOTAL FARM MORTGAGE DEBT
Per Cent of 1940



The Federal Reserve Bank of San Francisco points out that since the farm debt turned up in 1946 the rise for the the 7 states of the District has averaged 8 per cent per year. "... all states have recorded noticeably higher yearly increases than the national average.

☞ Reckless buying of land -- at extreme high prices is not warranted. Higher taxes are just one of the many increasing costs of operation. Beware of debt, taxes, drouth, Mexican cattle imports, boom high land prices -- AND lower cattle prices.

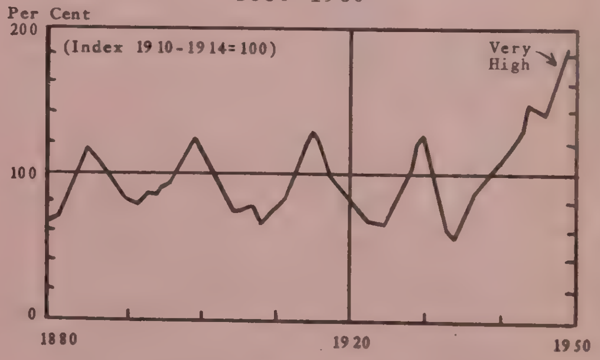
Read page 755 -- cattle "stampede" in the South. Western cattle face more competition from other areas -- more dairy cattle beef -- and more broiler and turkey meat.

The southeastern states produced almost one-half of the increase in the United States cattle inventory last year.

Cattle Prices Are High in relation to most other meats. University of Illinois says "...on the high part of their 15-year price cycle.

Iowa authorities state, "The long run demand for beef is good ... likely to last until we get around 10 million more cattle -- at least a couple of years."

HIGH BEEF CATTLE PURCHASING POWER, U.S.
1880-1950



The Dallas, Texas Federal Reserve Bank says with emphasis, "Based on previous experience, an ususually large element of risk is involved in beginning to expand cattle raising after the purchasing power of cattle has risen above the long-term average."

Look at their graph showing the extreme high of beef cattle purchasing power. Danger is ahead.

Beef production "has kept pace with population" growth during the past 10 years.

(Continued On Back)

(Printed in U.S.A.)

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RANCH, LIVESTOCK AND CROP MANAGEMENT

"The Nation's cattlemen have learned to produce more with a given inventory of cattle..."

Dairy cattle numbers will increase -- they supply over one-half of the beef and veal.

Mexican cattle may be coming across the line within two years -- 500,000 head per year -- about the time our beef production is UP to much higher levels. It is too early to know, but the most recent reports on the Foot-and-Mouth disease control are encouraging.

"During 1949 all outbreaks of active infection were prevented from spreading and completely eradicated", according to the USDA. The quarantine will not be lifted soon -- but can come much earlier than expected.

Prices Will Continue High for cattle and be profitable for efficient ranchers and farmers combining cattle with crops. Keep herds up to the numbers needed for sound long term management. Prices will not continue high enough to pay out on fantastically high land and cattle prices on inefficient units or under mediocre management -- unless inflation is much more severe than seems possible at this time.

BUY PROTEINS NOW

The price of 41 per cent soybean meal, bulk Decatur, Ill., is about $51 per ton. This is cheap feed compared with corn and cottonseed meal. It will be used rapidly.

The soybean harvest is practically over and beans have moved into strong hands. Much farm storage. Prices on meal and pellets can move up anytime. Price declines will be small -- advances large.

Cottonseed Meal is far short of demand and cheaper proteins should be used where practical. Ranchers who use cottonseed meal and cake regardless of price should buy early.

Alfalfa Pellets have a great future in the opinion of some authorities. Check the price in buying proteins.

SHEEP SHORTAGE

In contrast to the prospect of rapid increases in cattle numbers -- sheep will be far short of meeting lamb and wool needs. Consider this fact in long range plans.

The United States is producing less than one-third of the wool used in this country. Wool prices will continue high for many years.

Beef production will be more profitable than sheep for a few more years, on land where both are equally well adapted. But, already many farmers and ranchers are adding more sheep -- they expect income from wool to remain up after profits from other livestock have gone down.

"The Sheep Industry" of the 7 western states is reviewed in a 19 page supplement of the San Francisco Federal Reserve Bank. Write direct if you want a copy.

NEW AND NEWS

More Hay can be profitably harvested "from scattered low places in the range country" by use of pick-up balers -- adds to hay crop.

Log Market is "Red Hot" according to a Washington state leaflet -- "your woodlot may need thinning".

Suction-Brush seed harvesters, in California used to glean after harvest, recover much more small seeds like ladino clover and birdsfoot trefoil.

Beef Bulls that are rapid gainers as calves and up to 15 months of age, transmit their rapid gaining ability to their calves in 8 out of 10 cases. Oregon experiments show that rapid gaining steers may produce 40 per cent more beef from their feed than slow gainers.

Cotton Picking with machines in California in 1948 cost $30 per bale -- hand picking $45 or more. One machine did the work of 25 to 30 hand workers.

Rainfall 20 per cent above normal in the Great Plains perhaps doubles crop and grass yields, according to the Wichita Farm Credit Administration. For 10 years rainfall in western Kansas and adjacent areas has averaged 20 per cent above normal. Beware of drouth -- 20 per cent below normal can be disastrous.

Slaughter of meat animals in Texas and the 11 western states has nearly doubled during the past 25 years. The Atlanta, Georgia Federal Reserve Bank states, "Because production of livestock in the West increased only one-third ... fewer meat animals are available for shipment to the East". The pattern for meat production and marketing is shifting rapidly.

→ More animals should be fattened in the West and South.

→ Processing plants will in some cases need relocating or expanding.

→ Railroads need to adjust freight rates to the changes.

More Hogs should be produced in the West. The meat types can be grown on legumes and grain sorghums, barley, wheat and corn. It is a neglected opportunity.

Leaders should request the pamphlet "Expanding Livestock Production Makes Controls Unnecessary" from the American Meat Institute 59 E. Van Buren Street, Chicago 5, Illinois.

THE WEST
RANCH, LIVESTOCK AND CROP MANAGEMENT

Livestock slaughter in Western States has doubled in the last 25 years, from 3 billion to 6 billion pounds. Western slaughter houses now account for 17 per cent of the total commercial slaughter in this country.

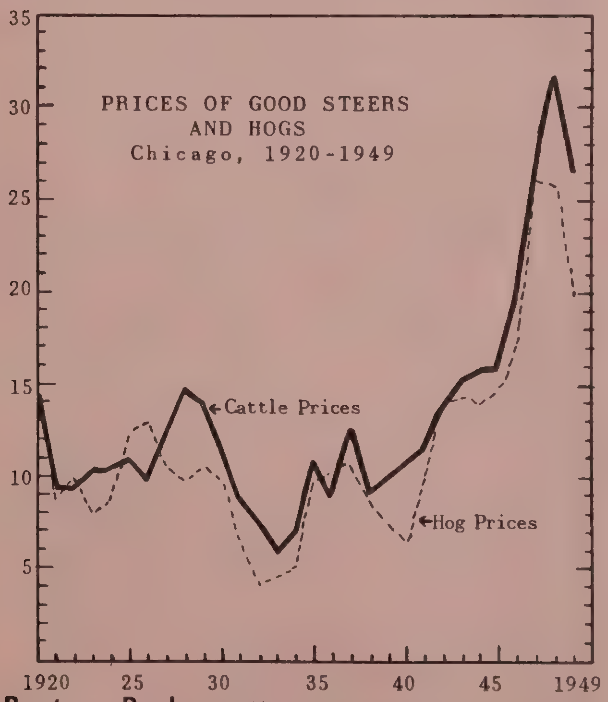
During this same period, slaughter of meat animals in 36 other states increased one-fifth.

Because of this increased slaughter and a much smaller increase in production, the percentage of animals shipped to eastern markets has dropped steadily. Western markets, more and more determine prices paid to western ranchers and farmers.

Most western states still produce a surplus of cattle and sheep, but the amount of this surplus has decreased.

Only four states, Montana, Idaho, Wyoming and New Mexico, produce a surplus of hogs, and in each the surplus is small. West Coast packers buy hogs as far east as the western edge of the Corn Belt. Movement of dressed and cured pork into the West also is large.

Population in the West has increased two-thirds and is expected to continue growing at a much faster rate than the rest of the country.



Beef vs Pork continues to bring in a lot of questions. Will beef permanently command a big premium? Our answer is briefly, NO.

The spread between beef and hog prices has been greater than $4.50 in only four years out of the last thirty. ☞ Beef cattle prices will decline toward the level of hog prices.

→ In the period of declining prices after 1928, cattle prices moved down to close the spread between beef and pork. (See graph)

→ In the period of increasing prices after 1940, hog prices moved up to close the spread between hog and cattle prices.

☞ The cattle production cycle has turned UP -- there will be more beef. Less spending money per capita will cause a shift of demand from beef. Cheaper pork, eggs, margarine, butter, milk, chickens, turkeys, and ducks will help pull beef prices down.

Even so -- beef cattle prices will continue well above the level of pre-war years.

Wool Support Price will average 45.2 cents per pound on a national basis to March 31, 1951. Prewar prices have been averaged with the 1949 open market prices as the basis for establishing the price relationship between grades. This will prevent price differentials from being fully affected by any abnormal relationship in the 1949 market.

Small Flocks of 50 to 300 ewes, where there are crops, can bring in good income every year regardless of other ranch income.

Costs will be low -- half of grazing will be on otherwise wasted feed.

Labor needs will be low -- more farmers and sheepmen are fencing. Many ranchers graze small flocks of sheep outside and corral them at night. The menace of coyotes is becoming smaller.

A good, big ewe can produce $30-$40 of grass income during each year.

Range Sheep industry is striving for more profitable management.

Herders are being replaced by fences. It costs up to $600 per mile to fence in rough country, but you can run one-fourth to one-third more sheep at less expense.

Sheep get more feed from the same amount of range -- they go where herders would fear to follow. Sheep don't bunch up and tramp out the range, and wool is cleaner.

(Continued on back)

DOANE AGRICULTURAL DIGEST ® MAY, 1950

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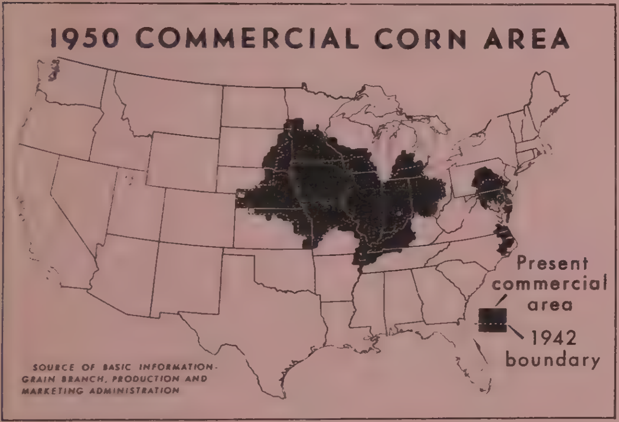
LESS DEMAND FOR FEEDER CATTLE

Dual grazing is accomplished -- cattle in the meadows and lowlands -- sheep in the rough uplands.

Better breeding to get higher quality, longer staple wool and culling to get better producing ewes all add to the profit Sheepmen are buying rams, classified as to fleece, growth and other desirable features, from neighbors rather than importing expensive rams. Good operators can get 50 to 60 per cent more wool and lamb income from same feed.

California pastures and other feeds are increasing faster than cattle. A good spring, with a fair amount of rainfall, indicates a good year for pasture and alfalfa. There may be a surplus of irrigated pasture in the state this year. Livestock feeds have been planted on land taken out of cotton, beans, rice, and early potatoes. Stockers and feeder cattle are commanding high prices.

Less Demand For Feeder Cattle will result from the forced cut in corn acreage in the commercial corn areas shown on the map. Cut asked is 1 acre out of 5.


1950 COMMERCIAL CORN AREA
Present commercial area
1942 boundary
SOURCE OF BASIC INFORMATION GRAIN BRANCH, PRODUCTION AND MARKETING ADMINISTRATION

U. S. DEPARTMENT OF AGRICULTURE

This cut in Corn Belt cattle feeding that will result from the government corn support program makes it doubly important for western cattlemen to --

1. Make every effort to sell fat cattle off of grass. Packers will bid up such cattle that are fat enough to kill.
2. Where practical feed cattle for the West Coast and other western markets.

Protein cake and meal production from 1950 crop should be as large as for the past year. BIG increase in soybean meal will offset the cut in cottonseed and flaxseed proteins.

G. B. Thorne, V. Pres., Wilson and Co. says:

"In 1949 consumers spent 2.6 per cent of their income for beef -- 2.2 per cent in 1940.

"... has been an increasing demand on the part of the consumer for 'Good grade' beef... adversely affected the demand for beef of lower quality. ... packer may not be able to make as good a market for what we have called two-way cattle..

→ "plain grass cattle are going to be harder and harder to sell.

"A fed steer produces about 50 to 60 pounds of tallow -- two years ago, tallow was worth 25 cents a pound, last year about 12 cents a pound, and is currently ... about 6 cents. ... has made the live steer worth about $1.00 per cwt. less.

"Another unfavorable development is the increasing use of leather substitute materials.

"The slaughter lambs and feeder lambs have been coming off the range at heavier weights in recent years. The feeder has wanted to put the usual 30 to 40 gain on his lambs....

"... in spite of the growing discounts on lambs over 90 pounds, and especially sharp discounts on lambs weighing over 100 pounds.

→ "... doesn't pay to put an extra 10 or 15 pounds on a lamb and then take less total money for the lamb on the market."

Rex Beresford, beef cattle authority at Iowa State College says --

☞ "... the prospective upswing in cattle numbers should be rapid and perhaps to the highest level in history ... 90 million or more cattle by 1954 or 1955.

"... a quick comeback in calf production.

"With normal business conditions, demand should keep up with probable supply..."

All beef cattle producers should get Beresford's recent Bulletin P102, RAISING BEEF CATTLE, Iowa State College, Extension Service, Ames, Iowa.

Vitamin Deficiencies increase with drouth. Montana authorities are finding deficiencies in cattle in the area which was affected most by drouth in 1949. Feed companies are cooperating by fortifying the pellets sold in the area.

Birdsfoot Trefoil in some cases has produced good irrigation pasture on alkali land. Leveling to insure good surface drainage is the main requirement. One case is reported of good growth of this grass on land previously producing only poor salt grass and considered "worthless for cropping".

Dry Edible Beans support prices will average $6.30 for thresher run beans grading U.S. No. 2 or better -- $6.55 last year. Loans and purchase agreements available through January 31, 1951. Your local PMA office should have a complete schedule of supports by types and areas. Production is expected to drop almost one-fourth under the record 20 million cwt. of last year.

RANCH AND LIVESTOCK MANAGEMENT

The deep concern regarding the probable trend of cattle prices during 1949 is expressed to us every day. After the price drops of last fall, that brought losses and very slim profits to so many, ☞ CAUTION RULES. Here are some of the questions and our answers.

'WE ARE PLANNING A SALE this coming April of approximately 60 head of registered Herefords. . .would you advise it be sooner?'

Registered livestock prices fall faster than the prices of commercial livestock in a period of declining prices and early sales usually are at the highest price. However, April should be a good time for your sale. Seasonal price factors this spring are expected to be strong enough to overcome the tendency to lower prices which is now developing.

'I HAVE 50 STEERS, good and choice, that weighed 475 pounds last September and cost 30¢ per pound. I am never short of good pasture. I usually market near the first week in September.'

They are adjusted to your farm and on a plan of handling that has been profitable for you in the past. Stick to your usual program but consider two modifications depending upon the way things develop:

1. Make most of your summer gains on grass. Limit feeding until the size of the new corn crop can be estimated and you feel more certain of price trends later in the year, or

2. Start feeding not later than early June to sell by early August -- 30 days earlier than usual.

'I WAS CONTEMPLATING BUYING steers the latter part of March or the first of April. . .?'

There will be a scramble during the spring for cattle to graze. IF you are going to buy, the earlier you buy the better selection and price you are apt to get.

In Arizona last month we found ranches still short of cattle. Rain and snow will insure good spring feed.

Texas shipped out sheep and cattle due to the severe drouth last year.

Oklahoma is short of cattle.

The cattle losses in the Great Plains and other northern states, due to winter storms, have been heavy and add to the shortages.

'WHEN WOULD YOU SUGGEST I buy stock cows to increase my herd? Do you think it is a good investment to expand my cow herd this spring?'

Unless there is a severe break in prices such as occurred last February you will do well to wait until next fall. Any of the following may give you the opportunity to buy cows cheaper by then;

1. A general break in the economy,
2. Widespread drouth or
3. Lower prices next fall as more meat rolls into market due to stepped up hog and poultry production.

We asked the Head of Animal Husbandry in one of the leading agricultural colleges if he was willing to recommend the purchase of beef cows at present prices. He indicated that he would do so only if there were special circumstances or unusual efficiency.

TIME FOR CAUTION

Never in 10 Years have we seen such wide spread caution regarding the cattle situation. It is healthy. It is time to proceed with caution.

☞ Stick to proven programs. Don't sell good young stock cows needed on the ranch or farm.

Steers that will fatten on grass next summer, and be ready to sell grass fat in July or early August, carry less risk than most other market cattle.

Meat Trends -- The availability of meat will be ". . .lowest in the second and third" quarters of the year -- April to September inclusive.

"Indications are that there will be some leveling off in demand for meat, but it is expected to continue strong. . ." John F. Krey, Chairman of the Board, American Meat Institute.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
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SHEEP IN STRONG POSITION

The growing concern over the future of cattle prices should cause more interest in sheep. If your ranch or farm is adapted to sheep -- this may be the time to step up your lamb and wool output.

If you formerly depended upon sheep and have shifted over strongly to cattle -- it will be especially important to restudy the place of sheep in your future operations.

Diversification is still an important safety factor in ranching and farming. It is especially to be desired when it can be had with little or no sacrifice in the total income.

☞ This winter has illustrated WHY.

Wool has gone up while cattle prices have declined.

Lamb prices are about as high as a year ago. Cattle prices are lower.

Why be at the mercy of one price trend when you can spread your risk between three -- beef, lambs, and wool?

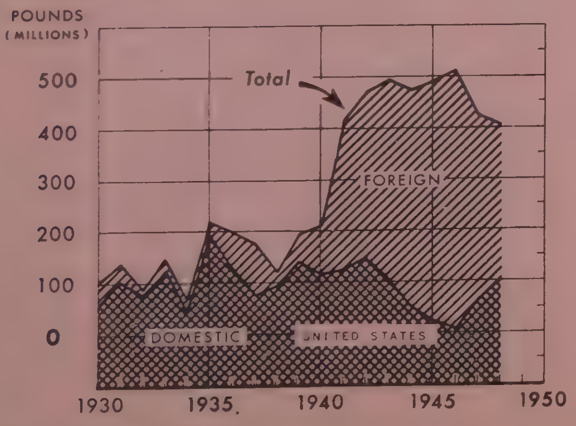
During ten years of up markets it didn't make so much difference. When profits are more uncertain spread your risks.

Short Turns carry the least risk when there is danger of price declines.

Sheep give quick returns -- within six months either lambs or wool can be sold from a breeding flock. Beef cattle are slower -- once a year.

This short turn is especially important for new farmers and ranchers who are not strongly financed.

MILL CONSUMPTION OF APPAREL WOOL



U. S. DEPARTMENT OF AGRICULTURE

Consider the Weather and your type of range. The lush abnormally rank growth of range forage of recent years has encouraged cattle grazing on sheep range.

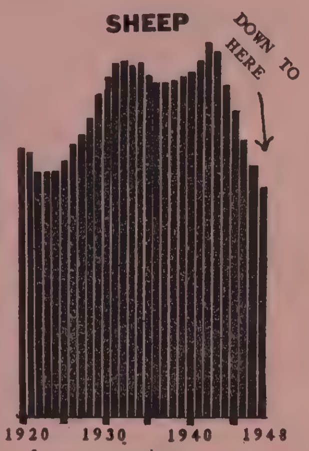
If you have range forage best adapted to sheep, you will be in a much stronger position for less favorable weather, as well as for the more uncertain markets of the future, with sheep.

The Great Shortage in sheep numbers is of course the BIG reason why you should be doubly interested in sheep if they belong in your program. The accompanying graph shows the terrific drop in sheep numbers, down over one-third since the peak was reached in 1942.

THE DECLINE IS CONTINUING

Numbers now are the smallest since the Civil War. By mere scarcity sheep have a more solid base than many of the other livestock enterprises.

Not Enough Wool is produced in the United States to meet our needs. Imports must be made each year and these have been very heavy in recent years as the graph shows.



The government is committed to strong support for wool prices. The 1946 level of 42.3 cents per pound was set for the 1949 support price. But due to extremely high foreign prices the finer grades should be far above support levels. Early contracts in the West are reported at 52 to 60 cents.

Wool is storable and can be much more strongly supported than perishables.

If You Need More Sheep for your ranch or farm, it would appear safe to get them during the next nine months. Any inventory loss on the purchase price should be returned rather quickly by the sale of wool and lambs.

☞ -- When we said recently "to use all your grass" except a "10 per cent safety margin against drouth" -- we were suggesting cow numbers be reduced in line with the best range management. We believe in maintaining ranges.

RANCH AND LIVESTOCK MANAGEMENT

Livestock prices are again being pushed too high for the good health of the industry over a long-time pull. Consumers and the meat trade are resentful. Herds are being depleted. Some cattle and sheep men are speculating or operating on margins that are too thin at these precarious high price levels and will be hurt when prices drop.

Farmers and ranchers are not responsible for these high prices. They have used every effort to produce all the meat consumers want. It is the money flush buyers who are bidding up the meat. Even so, farm and ranch operators and those financing them should recognize the damage that will result from such fantastic prices.

STATISTICALLY, there are many reasons for prices of meat animals and poultry to remain at extremely high levels. Statistically, there was little reason for the price breaks of last February. Therefore, do not complacently assume that prices will continue at the extremely high levels.

PSYCHOLOGICALLY, there are many reasons to be prepared for lower cattle, lamb and hog prices at any time.

For the moment, every one has a job that wants one. The third round of wage raises is almost complete. More inflation props have been put under the economy. The election year and war preparation are diverting attention from some of the slowly operating economic adjustments that are overtaking this inflation boom.

☞ Keep your position well protected.

CAUTIOUS OPTIMISM seemed to be the attitude of the 175 Nebraska bankers who met for their annual clinic. They were a hard working, conscientious group, deeply concerned with the sound financial guidance of their communities.

One reported a $5,000 loss by a lamb feeder last winter (poor handling and feeding). The traditional loan of ALL the cost of feeder cattle and lambs to farmers who have the feed will not be made in many cases this fall. It is recognition of the fact that feeding operations can easily lose more than the feed if unemployment develops.

- High costs of feeders,
- Tightening of finances, and
- Experienced feeders staying out

will limit the outlet for feeder cattle at present prices -- especially the kind that should have a long feed.

Perhaps more than offsetting those influences will be the BIG CORN CROP and the high profits from feeding during recent years. ☞ Unless the general economy gets some set-backs there will be active competition for stocker and feeder cattle and lambs this fall.

EXPORTS are not the cause of high meat prices. According to Ohio State University, "Exports from the 1947-48 U. S. meat...were only 39,000,000 pounds more than average prewar annual exports." The Federal Reserve Bank of Kansas City says "...the United States has not been a heavy exporter of meat... The proposed E.C.A. shipments will represent only 0.2 per cent of the 1947 production...and will rise to only 0.8 per cent in the fourth year. This is hardly large enough to exert much pressure on domestic prices."

THE SOUTH is steadily expanding its production of beef cattle in relation to other areas. The importance of this development was discussed February 29 by Federal Reserve Bank of Atlanta, Georgia:

"Grazing Crops, An Efficient Use of Labor and Land" is the title of the article. They state that, at present prices for beef calves of about 18¢, "The net return above cash costs would have ranged from $10 to $16 an acre.

".....the hourly returns from the sale of milk range from 60 cents to $1.30.

"Those from the sale of beef range from $1.25 to $1.50 an hour." These show why more meat will come from the South as pastures are developed."

CHEAPER FEED is available in many areas where there are embargoes on wheat shipments. ☞ Switch promptly off of corn and other high priced feeds. Use these cheaper grains to carry feeder pigs and other livestock until new corn is ready.

DOANE AGRICULTURAL DIGEST AUG., 1948
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BULL INDEXING

BEEF CATTLE IMPROVEMENT THAT IS NEW AND IMPORTANT

Bull indexing experiments have now gone far enough to prove that indexing is --

☞ Practical; that it can
☞ Add Millions of dollars to the income of cattlemen; and will add
☞ Great Quantities of Beef for meat hungry consumers.

It may be less spectacular than hybrid corn and DDT but it may eventually rank as one of the major new developments in farming. Here is a special report prepared for our Digest Clients by H. R. Stukey, Montana Extension Service.

For 10 years the U.S. Range Experiment Station and the Montana Agricultural Experiment Station have been engaged in a cooperative sire testing program through feed lot performance of their offspring. There was a need for another "measuring stick" besides the usual appraisal in determining the desirability of sires.

Fred S. Willson of Montana State College has this to say regarding the Montana bull indexing program.

80% INHERITABLE-"Since 1940 the performance of bull calves in the feed lots has been compared with the performance of their steer progenies in the feed lot. There have been over 60 bulls and about 600 of their progenies studied to date. ☞ The sire's performance in the feed lot is found to be over 80% inheritable.

"The factors considered in this work with beef cattle are: Weaning weights, gain in feed lot, final weight, digestive disorders, feed required per 100 lbs. gain, market value, and net returns above feed and marketing costs.

"Since the physical factors are so highly inheritable, we can speed up the sire testing program through the comparative feeding test of prospective herd sires."

TEST THE BULL CALVES "We can predict with reasonable accuracy what a sire's progeny will do by his own feed lot performance as a calf.

"As shown in the table, bull No. 6 made a gain of 468# and averaged 2.8# per day during the 168 day feeding period. Bull No. 11 gained only 303# and averaged 1.8# per day.

"Great improvements through bull indexing can be made in total income from Montana cattle if the low producers such as No. 11 are eliminated and bulls such as No. 6 are used in the production of market cattle."

The table below shows a few comparisons.

BULL INDEXING -- 168 day feed

BOZEMAN, 1946-47	Bull No. 6	Bull No. 11	Ave. for 14 Bulls
Initial weight	612	692	550
Final weight	1080	995	937
TOTAL GAIN	468	303	387
Ave. daily gain	2.8	1.8	2.3
Ave. daily feed-hay	6.1	6.0	5.4
Ave. daily feed-grain	11,7	10.6	10.4
Hay per cwt. gain	218	335	236
Grain per cwt. gain	420	588	454
*COST per cwt. gain	$13.94	$19.83	$15.07

*Cost of Feed
Grain Mix -- $2.80 Cwt., Hay -- $20.00 ton

HOW TO DO IT"Bull indexing work can be carried out by the individual breeder on his own ranch.

1. "All that is needed is a set of scales to weigh the calves into the feed lot and to weigh them again at the end of six or seven months.

2. "Individual feed records are desirable but not absolutely necessary.

3. "Calves should be fed by sire groups if possible.

"Rate of gain and efficiency of gain are correlated closely enough so that the rate of gain is a fairly accurate measure of their feed lot performance.

4. "Bulls which do not measure up should be eliminated."

Dr. R. T. Clark is assisting all Agricultural Experiment Stations in the Western States in setting up "Projects" directed toward the improvement of beef cattle through breeding methods.

BREEDERS SHOULD ACT

It appears clear from the foregoing that the time has arrived for breeders to start applying these tests to the bulls they offer for sale. Those who apply such new developments first often profit most.

ARE YOU indexing your bulls? Have you results that would be of help to other Digest Clients? We would be glad to know of your experience.

THE WEST
RANCH, LIVESTOCK AND CROP MANAGEMENT

Dean Homer J. Henney of Colorado A&M College writes, "So long as we have atomic scares in the United States, many wealthy city folks (New York, Philadelphia, Washington, D.C., Boston, Chicago, etc.) will keep moving their families to the wide stretches of the west."

This, plus the growing appeal of western ranching, has been a factor in the rapid rise in land values.

They went too high, too fast.
They are coming down first and most.

The map and figures given on this page in May have been further confirmed by land prices as of July 1. From the World War II high, the decline in land prices has been --

	Per Cent
U.S. AVERAGE	3
Montana	12
Oregon	10
Wyoming	9
California, Colorado, Texas and Washington	8
Idaho	7

Only six states east of Colorado and Texas have had land price declines as great as 5 and 6 per cent. In six states prices have either increased or stood still.

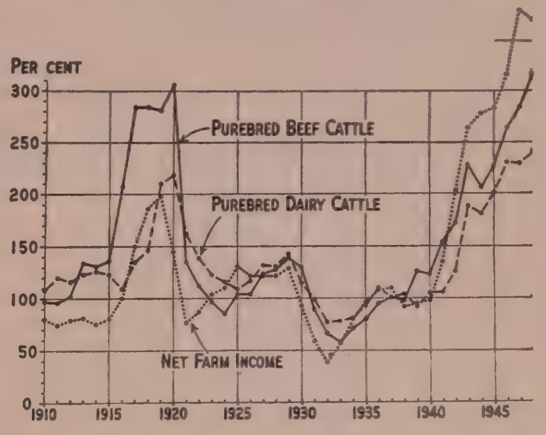
GUIDES TO SELLING AND BUYING

Land investments should be critically studied according to their productivity and carrying capacity -- and the price at which they will sell.
Consider taxes -- now and in the future.
Dependable income land with moderate taxes will decline slowly in price.
Poor range and crop land -- on which grass and crops often fail -- will drop in price. Taxes and other costs may eventually cause abandonment of title to the less desirable range lands.

Protein cake and meal will not sell at bargain prices. There is less per animal unit than last year. It looks like the safest procedure will be to buy most of your needs within the next 60 days, preferably within 30, if you can store.

If on a cash basis for income taxes, purchases before January 1 will be charged against the profits of this year.

Purebred cattle prices are reported by A.A. Dowell of the University of Minnesota. Below is his most recent graph.



Index numbers of prices received for purebred beef and dairy cattle sold at auction, and of net income of farm operators in the United States, 1910-48 (1935-39=100).

"Purebred beef cattle prices fluctuated more violently than purebred dairy cattle prices...

"Past experience suggests that a severe or prolonged decline in net farm income is likely to be followed by a decline in purebred cattle prices."

Some new breeders should cash in their purebreds and shift to commercial operations.

Proved Bulls -- Purebred breeders should consider getting "indexing" started. It is going to take more than "fine looks" and a blue ribbon to compete with feed lot records.

Put at least some of the show expenses on proving bulls. Write Montana Experiment Station for information.

Fence is a profitable buy for those who have sheep range adapted to fencing.

MORE HOGS FOR THE WEST

There will be an increase in hog production in the western states. More pork is needed for the increased population. Surplus wheat and grain sorghums will make more feed available. Cutbacks on surplus crops in 1950 will give more acres on which to grow feed grains.

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MORE SLAUGHTER FINISH NEEDED

By making full use of pasture -- like irrigated alfalfa -- pork can be made with limited grain. "Meat type" hogs will be grown.

Note the price premium being paid to get the extra pork needed.

California	$20.50	per hundred
Chicago	$18.50	" "
	$ 2.00	premium

Hogs are being shipped from western Iowa and Missouri to care for the West Coast demand. ☞ Consider a hog enterprise for the future -- if you are favorably located with reference to markets and a supply of grain.

WANT SLAUGHTER CATTLE

West Coast demand is for slaughter cattle and grass fat sells well.

This single fact should cause western ranchmen who have produced feeder cattle in the past to consider shifting their methods in the future. Since the West Coast markets are so often outbidding the Corn Belt feeders -- it is good business to go after the extra premiums that may be had by stepping up the finish.

Don't plan to sell feeder cattle when you can put a slaughter finish on the cattle with pasture and range management or feeding.

More Feed will be produced on the acres cut out of cotton and other crops. "California will be faced with a diversion of over 300,000 acres from cotton to other field crops and pasture.

"This is all irrigated land and can go into alfalfa and irrigated pastures--too expensive for raising cows and calves...a good place to feed weaner and yearling feeders..."

By shifting to more weaner calf sales -- to feed out on irrigated areas -- the range lands can carry more cows. It means more total cattle production.

Freight Rates. Broad inquiry shows that the increases are not the controlling factor in the shift of livestock shipments. All agree that the dominating influence is the huge population increase on the West Coast.

A further shift to trucking is indicated -- even dressed meat is moving on long hauls on the highways.

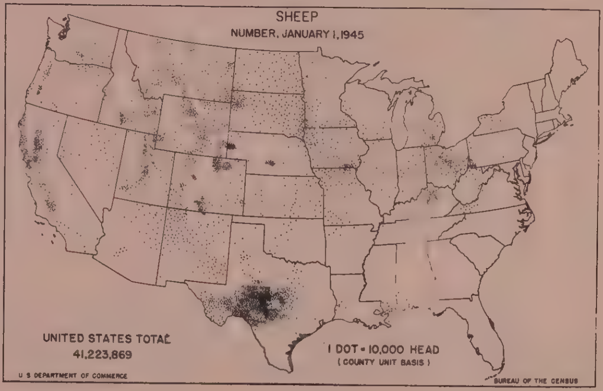
One authority thinks more large inter-mountain packing plants may develop.

Southern Cattle will have to fill "the void" left by more beef moving west. The Corn Belt may need to go south and southeast for more of their feeder cattle, according to men who are watching the shifts.

Texas is shipping more cattle west. During the past five years as compared with the previous five, "The increase was 40% as compared with a slight decrease in the total movement of cattle out of Texas."

WHERE THE SHEEP ARE

We have pointed out that more hogs will be grown in the West. On page 756 we show the probability that more sheep will be produced in the South -- where there are practically none now.



The above map is based on 1945 sheep numbers of 41,223,869.

Since then there has occurred the terrific drop down to 27,818,000 head. Most of the reduction has been in the West. More small farm flocks will develop and western range lands best adapted to sheep but now used for cattle will be returned to their previous use.

LOTS OF NUTS

A huge nut crop has been produced on the West Coast this year.

Almonds are estimated at a record-large crop of 42,000 tons, one-fourth above last year and double the 1938-47 average.

Walnut production, another record crop, one-fourth above average. Quality good.

Filbert production is double the 10-year average.

Pecan crop of the U.S. is one-fourth above the 10-year average, although one-fifth smaller than in 1948.

RANCH AND LIVESTOCK MANAGEMENT

Wheat acreages are to be cut back 17 per cent for the 1950 crop. The reductions will probably be most severe in the Great Plains states. By this government action 14 million acres must be shifted out of wheat into other use.

More acreage reductions will follow as more wheat piles up on the farm. Marketing quotas or other penalties will eventually need to be used to hold growers in line.

WHAT TO DO with land forced out of crop production is no longer a future problem. Act now for best results.

Drouthy and other "marginal", high hazard croplands should be permanently seeded to pasture or hay. That means more cattle or sheep.

More summer fallow should be used in dry farming areas to make fewer crop acres produce more grain.

Check the regulations as they are issued. It may be advisable to allow for winter kill and other causes for abandonment, and over-plant your allotment to that extent.

Provide for the further cut-backs as you rework your operating program to take more than one acre of every six out of wheat.

Many ranchers and farmers realize the need for more livestock but want to know when to buy and what to buy. The correct answers depend upon the ranch or farm, the feed supply and the markets, but here are broad suggestions.

BUY EWES as the first choice where one or more of these conditions exist:

If the range is primarily adapted to sheep.
If the present flock is too small for efficient handling.
If the climate permits early lambing and marketing.
If money is more limited than labor.
If the operator likes sheep.

MR. CHARLES W. LILLEY, JR., who grew up on a Colorado ranch and has worked on Wyoming ranches, has joined our staff. He is a graduate of Colorado Agricultural and Mechanical College and will help with our work on ranch management, irrigation and other phases of western agriculture.

The price of ewes probably will be lower before November -- BUT it may not pay to wait. Being certain of getting good selection, desirable quality and in time to breed for the best lambing dates, may be more important than trying to buy at the low point of the market.

If you are going to buy more stock sheep, we suggest the purchase be made as soon as the ewes you want can be had at prices well in line with the market.

Good ewes are expected to show profits because of the strong future for both lambs and wool.

LAMBS are expected to sell at lower prices during the fall -- BUT for the next few years lambs will sell high when compared with pork and beef. Early lambs especially, will continue to show good profits -- remember the high prices of last spring.

Wool will be supported by the government at high prices -- much above the long-time averages.

Efficient sheep men will continue to prosper.

BUY YOUNG BREEDING STOCK to come out on the long-time pull on a down market. The gain in weight and continued production over a longer time gives most operators a better chance to work out even after taking the loss in value of the stock that is purchased.

The re-sale value of old ewes and cows that must sell as canners and cutters, is apt to drop fast. A greater spread will develop between the price of low and high grade meats than has existed during the period of meat scarcity.

DELAY BUYING COWS and heifers until the impact of more hogs, chickens and turkeys is felt on the market this fall. More unemployment will also be shrinking the demand for meat.

Wait out the market, but if you want the stock for next season, the purchases should probably be made before mid-November. Exceptions are local chances to buy drouth cattle such as have been moving in parts of Montana.

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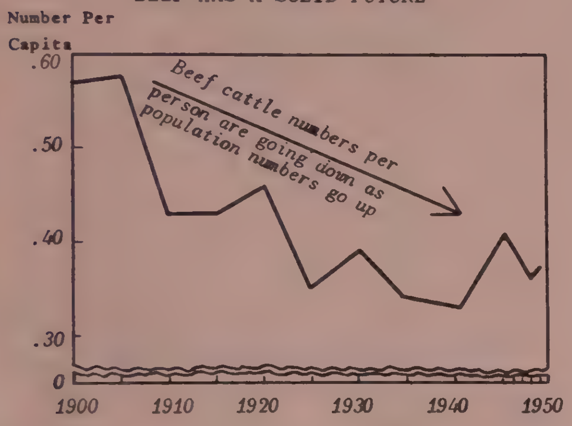
RANCH AND LIVESTOCK MANAGEMENT

IF SELLING COWS and for most other classes of cattle, do the reverse of the foregoing -- SELL EARLY.

Grass cattle are already moving out of the Kansas Flint Hills and Oklahoma's Osage pastures. Alert operators will not wait for the last pounds of gain on grass but will get their cattle to market while prices are strong.

BEEF HAS A SOLID FUTURE



SHOULD YOU SWITCH? One grass farmer with steers purchased as calves last fall was considering wintering them and feeding on grass a year from now. We figured that he has $30 to $40 per head profit in them now.

Our advise was to take his profit -- and restock with lighter weights about October. His pastures will of course be idle for 60 days.

☞ You don't go broke taking profits on a down market. Switching into reduced inventories and yet maintaining production is good business.

WEST COAST MARKETS want more fed beef. More cattlemen should feed their cattle up to slaughter grades and then ship west. Feeding on irrigated or other good pastures to step-up the finish should show profits.

The Pacific Coast markets are using the equivalent of almost all the beef produced in the 11 western states. The need is for slaughter cattle, not feeders. California's population jumped 43 per cent from 1940 to 1948.

Montana in 1940 shipped 22 per cent of it's beef cattle west -- in 1948 about 47 per cent moved west.

THE SMALL FARMER should be shifting out of beef cattle into dairying, unless his family labor has year 'round employment. Lower beef prices will make the living more and more skimpy -- where the beef herd is too small.

CATTLEMEN ARE NOT HAPPY over the fact that there are --

Increased imports of Canadian cattle, and

Army buying of South American meat, while the government is spending tax money to support other food prices.

FENCED SHEEP RANGES are increasing. H. R. Stucky, Extension Economist in Montana says, "Running range sheep under fence is quite common now in Southeastern Montana and this practice is beginning to show up in other sections of the state.

"The sheep make better use of the range, --

"They do not tramp out as much range, --

"The labor cost is cut sharply.

"In some cases new problems in water location, cross fencing, and rotation grazing may develop as the ranges are fenced."

BEWARE -- This month we were in a joint discussion with an English economist in this country for a three months tour under ECA. He had come through the west with the assurance that the "Dust Bowl" would not be repeated. "Was he correctly informed?"

In our conference was a top agricultural authority who knows the long history of the west. He said that the Dust Bowl would repeat when the next dry cycle comes to the Great Plains and other western areas.

Next time it will be even
☞ MORE SEVERE because,

1. More grassland that should never have been plowed has been torn up and seeded in wheat, and
2. Humus is being burned out faster than it is being replaced.

☞ Anyone who operates ranches, farms or a business, or who owns farm property in western areas subject to prolonged drouths should never lose sight of this danger.

Yes, we agreed with this agriculturist in saying to the English economist that drouths and the Dust Bowl will return -- But, farmers will still be able to produce more wheat than can be used or exported at prices based on our high price support level.

RANCH AND LIVESTOCK MANAGEMENT

Livestock moved into a position of new national importance when Secretary of Agriculture, Charles F. Brannan, delivered his proposed agricultural program. The Administration has now gone on record favoring the use of livestock as a means of helping use and store up surplus grains.

☞ "LIVESTOCK PRODUCTION SHOULD BE MADE A MORE IMPORTANT PART OF OUR AGRICULTURE", according to Mr. Brannan. He went on to say --

This increase in livestock is needed, "for the sake of keeping our resources permanently productive as well as to meet consumer needs..."

"... the need for improving the diets of consumers and for encouraging conservation farming..." does not indicate that restrictions on the production of "meat animals, dairy products, poultry and eggs" will be desirable at an early date.

FIRST PRIORITY -- "I recommend that the Congress designate those commodities which should have first priority on the funds available for price support purposes. This list should include the agricultural commodities of prime importance, both from the standpoint of their --
contribution to farm income and their importance to the American consumer family.
"This list should include, at least, the following commodities:
Corn, cotton, wheat, tobacco,
whole milk, eggs, farm chickens,
and the meat animals --
hogs,
beef cattle and
lambs.

"I recommend that the prices or returns of these first priority, or Group One, commodities be maintained at --
not less than the full support price standard."

Beef cattle and sheep are not now under the price support program.

THE COLOSSAL IDEA of H. E. Babcock, the farmer-statesman from New York state, which we reported to you in 1946 has now been given government recognition.

Babcock has continued to push the high level diet idea under such headlines as,

MEAT FOR EVERYBODY

SURPLUS FOOD? THERE'S NO SUCH ANIMAL

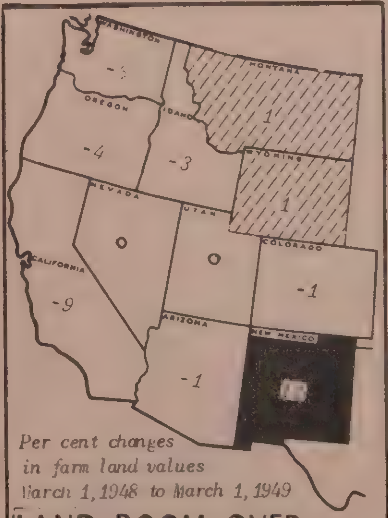
THE EVER NORMAL REFRIGERATOR

BETTER EATING MEANS BETTER BUSINESS FOR EVERYBODY

A NEW POSITION of importance for livestock, in the economy of the nation has now been clearly recognized by the national leadership regardless of politics.

During the last Presidential campaign, the Republicans and Governor Dewey were urging -- "An expanded livestock population ---- Without an expanding livestock population, an ever-increasing human population cannot maintain its standard of living."

As a means of turning surplus grains into more nutritious and energy building foods -- there is no substitute for livestock and poultry.



Per cent changes in farm land values March 1, 1948 to March 1, 1949

LAND BOOM OVER IN THE WEST

Decrease in 6 states
No change in 2 states
Increase in 3 states

As a means of using more pasture and forage produced on acres removed from grain and fiber crops---there is no substitute for livestock.

As a means of storing reserve food for emergencies such as drouth and war --- livestock can serve in a practical way for which there is no substitute.

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MORE GRAZING LIVESTOCK NEEDED

☞ Ranchmen and farmers can go forward with sound livestock production programs, confident that more and more their business will be recognized as a stabilizing influence in the nation's economy.

There may be much in the Brannan farm program with which you do not agree but the recognition of the strategic position of livestock should meet with approval.

NOT YET LAW - The proposed agricultural program is far from being enacted into law. Certain features are drawing vigorous opposition. The time yet remaining before congress is scheduled to adjourn may run out before such far reaching legislation can be worked out.

Therefore, do not make investments on the assumption that sheep and cattle will have price supports in the near future.

The conservative and reliable approach is to make expansions on the basis of the prices that will probably be paid regardless of government subsidy.

☞ Also, take action within the year to be ready to use the grass and forage that you will grow on the wheat, cotton and other lands that you will be forced to take out of crop production.

Wheat acreage restrictions, if they are to be used in 1950, must be anouced by early July which will permit purchases of stock sheep and cattle during the lower price period of the fall.

MORE GRAZING LIVESTOCK WILL BE NEEDED FOR IDLE CROP LAND

THE CHOICE you must make is whether to take little or no income from extra pasture, hay and other forage or --

take inventory losses on the purchase price of heifers, cows and ewes to expand your grazing herds.

For the long-time pull on ranches and farms adapted to raising sheep and cattle it will be good business to maintain breeding herds and flocks. Keep the numbers up to the ranch or farm capacity -- but always low enough to keep a strong safety margin of 10 per cent or more of surplus grass.

In adjusting herds it would appear that during the next 90 days may be--

☞ the time to sell irregular breeders, old cows and ewes that need to be weeded out of the herds and flocks. It depends of course on the local demand for stock to graze and the flesh of the livestock you would be selling.

☞ The time to buy on a declining market such as this year, will be this fall, unless there are distress drouth sales during the summer.

SHEEP have been demonstrating their strong position by the spectacular high lamb and wool prices during the spring. These bear out the warnings that we have given for several years that sheep numbers were being reduced too far.

More labor will now become available for herding and care of sheep.

Cattle will be in trouble on ranges best adapted to sheep when lower, more normal rainfall and sparse grazing return to the arid regions of the west.

New ranchers and farmers can expand with sheep,

with less capital than for cattle,
get a quicker return, and
twice a year income with diversification -- meat and wool.

More sheep are one of the big opportunities in agriculture.

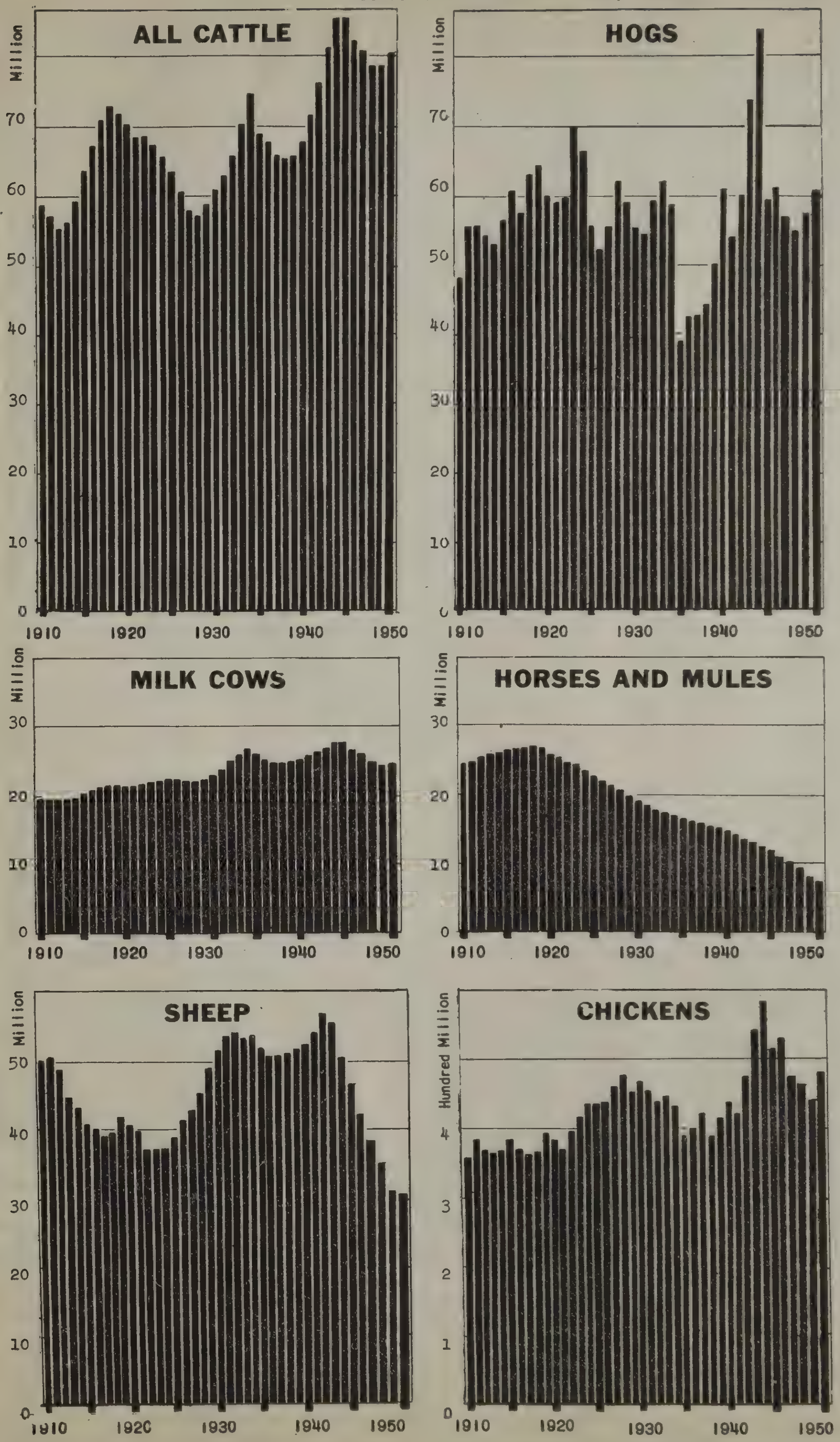
"SUCKER DEALS" in western lands continue to be reported.

A purchase of 2,400 acres of No. 4 and No. 5 grazing land for what the purchaser thought was "a stock ranch". The place could only run about 40 head.

"An obviously wealthy man bought a 600 acre place expecting to run up to 500 head of registered Angus cattle. He probably can run 100 to 150 head IF he spends considerable money on the place."

LIVESTOCK ON FARMS

LIVESTOCK AND POULTRY ON FARMS, JANUARY 1, (1910-50)



Based on USDA data

Livestock and poultry on farms and ranches showed a net increase during 1949 for the first time since 1943 -- up 2 per cent. The total on January 1, 1950 was above that of the past two years, but still 16 per cent below the peak on January 1, 1944. The main reasons for the upturn were a 3 per cent increase in cattle numbers and the first increase in milk cows since they started dropping five years ago. Hog numbers were up for the second straight year, and chickens and turkeys also increased. Sheep numbers continued the decline that started in 1942, but at a much slower rate. Horses and mules continued their downward trend.

The total supply of feed grains was second only to that of January, 1949, both in total and per animal unit.

CATTLE AND MILK COWS

The number of all cattle, including milk cows, increased about 3 per cent in 1949 to a total of 80,277,000 head. Beef cattle increased 5 per cent and dairy cows increased one per cent.

The outlook for beef cattle continues good. Numbers will continue to increase, but it will be at least 5 or 6 years before there is more meat per person than at present -- assuming population continues to grow at the present rate.

A 2 per cent increase in one to two year old dairy heifers and a 6 per cent increase in dairy calves being kept for milk cow replacements indicate farmer intentions to increase milk cow numbers in the future.

The number of steers over one year of age was 7,027,000 -- smaller than in the most recent years, but greater than in any year between 1925 and 1943.

Even with a larger number of cattle, lower prices resulted in an inventory value of $9,873,710,000 or 6 per cent less than the record of $10,552,421,000 established a year ago. The average value per head of all cattle at $123.00 was $12.00 or 9 per cent below the record high value of last year. Milk cow prices also declined by $16.00 from last year's peak of $193.00.

HOGS

Hog numbers increased during 1949 to 60,424,000. This is slightly below the 1939-48 average.

The number of hogs under six months old, was down 3 per cent from a year earlier, reflecting the unusually early and rapid marketings of the 1949 spring pig crop.

The average value of all hogs on farms January 1, 1950 was $27.10, compared with $38.20 a year earlier and $42.80 the record high value on January 1, 1948. The decrease in value this year more than offset the increase in hog numbers, and resulted in a total inventory value of $1,638,964,000, compared with $2,183,553,000 a year ago -- a drop of 25 per cent.

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DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

1950 LIVESTOCK NUMBERS AND VALUES

JANUARY 1, 1950

State and Div.	All Cattle and Calves 1000's	Value per Head	Milk Cows 1000's	Value per Head	Hogs Incl. Pigs 1000's	Value per Head	Stock Sheep & Lambs 1000's	Value per Head	Horses & Mules 1000's	Value per Head (Horses)	Value per Head (Mules)	Chickens 1000's	Value per Head
Maine	214	$121	121	$169	32	$ 25	22	$ 13.	25	$ 75	$ —	3,006	$2.02
N. Hampshire	118	145	70	200	13	26	7	15	10	62	—	2,664	2.05
Vermont	433	147	288	190	21	22	12	14	30	51	—	1,076	1.91
Mass.	179	196	123	254	94	25	8	15	13	65	—	5,197	1.99
R. Island	27	211	21	251	9	26	2	14	1	68	—	604	1.90
Connecticut	174	191	118	248	30	24	6	14	9	70	—	3,511	1.93
New York	2,226	174	1,483	221	212	26	158	19	147	63	75	17,759	1.89
New Jersey	226	234	162	285	72	29	10	18	12	70	72	13,201	2.04
Pennsylvania	1,790	159	1,020	210	704	26	217	14	121	65	76	26,837	1.64
N. ATLANTIC	5,387	168	3,406	218	1,187	26	442	16	368	64	76	73,855	1.85
Ohio	2,149	132	1,060	175	3,176	2	930	15	138	54	65	19,686	1.43
Indiana	1,760	131	728	174	4,611	27	370	17	118	49	68	19,609	1.23
Illinois	3,159	137	992	191	6,285	30	396	18	196	45	61	22,937	1.23
Michigan	1,914	144	1,016	195	927	27	336	18	101	47	47	12,618	1.49
Wisconsin	3,804	170	2,432	214	1,666	30	195	18	225	62	63	17,954	1.41
Minnesota	3,276	140	1,486	195	3,498	32	554	17	265	46	52	28,471	1.33
Iowa	5,007	128	1,182	186	11,920	32	605	17	248	43	53	34,258	1.37
Missouri	3,107	118	975	152	4,429	25	1,054	16	426	36	57	24,124	1.10
N. Dakota	1,542	132	421	190	413	34	346	16	154	34	41	4,872	1.18
S. Dakota	2,479	126	379	182	1,442	35	721	18	171	30	35	9,036	1.24
Nebraska	3,920	124	477	186	2,475	32	168	17	245	33	47	14,307	1.20
Kansas	3,627	117	628	176	1,253	25	336	17	220	32	48	15,668	1.08
N. CENTRAL	35,744	133	11,776	189	42,095	30	6,011	17	2,507	42	57	223,540	1.27
Delaware	61	145	37	185	37	23	2	18	10	65	75	1,107	1.44
Maryland	449	151	245	195	270	21	47	18	49	64	75	4,368	1.39
Virginia	1,108	124	497	153	752	20	293	20	195	73	133	10,006	1.31
W. Virginia	559	113	234	139	256	21	296	17	91	69	74	4,314	1.29
N. Carolina	710	100	387	128	1,120	23	40	18	330	96	179	11,087	1.35
S. Carolina	367	91	172	124	663	21	3	11	172	105	184	4,764	1.45
Georgia	1,220	83	406	123	1,700	21	13	10	258	84	131	8,708	1.36
Florida	1,392	72	152	120	619	20	12	8	51	84	120	2,942	1.49
S. ATLANTIC	5,866	99	2,130	142	5,417	21	706	18	1,156	79	157	47,296	1.36
Kentucky	1,608	107	634	137	1,668	23	700	21	313	52	74	11,796	1.07
Tennessee	1,462	101	640	129	1,371	22	265	17	325	52	73	11,019	1.08
Alabama	1,330	80	430	117	1,225	19	22	11	246	62	98	8,178	1.15
Mississippi	1,674	78	543	111	965	17	104	8	380	45	71	7,549	1.11
Arkansas	1,209	87	444	117	974	18	51	12	270	34	56	7,825	1.05
Louisiana	1,439	86	331	128	731	16	140	8	226	47	79	4,953	1.40
Oklahoma	2,655	104	654	141	835	18	105	14	240	26	39	11,102	1.01
Texas	8,658	104	1,296	139	1,701	21	6,703	15	491	35	48	27,384	1.11
S. CENTRAL	20,035	98	4,972	130	9,470	20	8,090	16	2,491	40	72	89,806	1.10
Montana	1,731	128	128	185	192	25	1,623	19	154	26	52	2,054	1.39
Idaho	939	124	222	185	209	25	990	21	89	38	48	2,206	1.39
Wyoming	1,001	124	56	190	85	24	1,980	18	81	25	34	831	1.27
Colorado	1,746	125	202	195	351	25	1,186	21	116	30	44	3,483	1.24
New Mexico	1,166	118	60	174	73	23	1,364	19	86	32	47	1,129	1.43
Arizona	849	111	47	200	24	27	382	18	70	60	73	690	1.54
Utah	560	128	116	190	88	22	1,284	20	58	52	60	3,427	1.22
Nevada	552	122	21	195	28	25	435	20	36	51	60	300	1.44
Washington	885	125	329	174	160	25	298	18	56	41	45	5,573	1.62
Oregon	1,107	110	240	151	166	26	671	18	74	38	50	3,584	1.57
California	2,709	139	920	194	879	26	1,602	20	121	74	75	23,416	1.50
WESTERN	13,245	125	2,341	185	2,255	25	11,815	20	941	41	59	46,693	1.46
U.S.	80,277	123	24,625	177	60,424	27	27,064	18	7,463	46	99	481,190	1.36

(Continued)

HORSES AND MULES — Horse and mule numbers declined 9.5 per cent in 1949, reaching a new low of 7,463,000. At the peak in 1919, there were 26,434,000 head.

SHEEP — For the eighth consecutive year, sheep numbers have continued their decline. Stock sheep and all sheep numbers are the lowest in 83 years since records began in 1867. The 1949 decrease of 2 per cent is the smallest since the decline in inventories started in 1942. The 1949 lamb crop was not large enough to maintain sheep inventories during the year although there is evidence that interest in sheep raising is reviving. Numbers are now 27,064,000 head, about 45 per cent below the peak on January 1, 1942. Sheep and lambs on feed were down 7 per cent from a year earlier and the smallest since 1922.

The total value of all sheep and lambs was $548,248,000, or one per cent higher than the $543,862,000 last year. The average value of stock sheep was $17.00 last year.

CHICKENS — Chickens on farms January 1, 1950, including commercial broilers, were 7 per cent more than a year ago, but 1 per cent below the 1939-48 average holdings. Pullet holdings on farms increased 12 per cent during the past year, following an increase of 17 per cent in chickens raised in 1949.

The average value per chicken on hand was $1.36 compared with $1 66 a year ago.

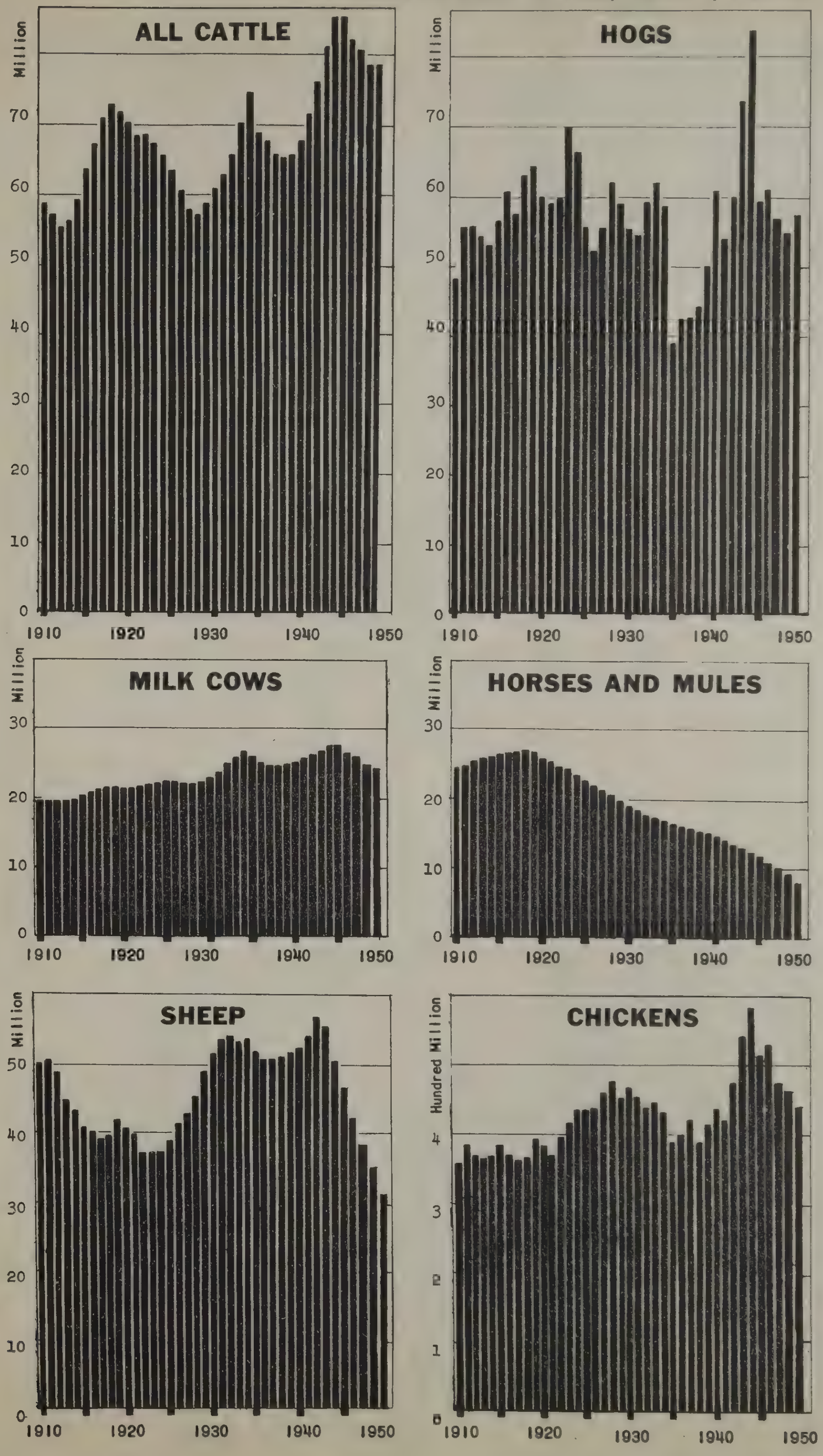
TURKEYS — Numbers rose to 6,120,000 birds, 10 per cent more than a year ago, but 13 per cent under the 10-year average.

LIVESTOCK ON FARMS	NUMBERS			VALUES		
	Jan. 1, 1950	Jan. 1, 1949	Av. 1939-48	Jan. 1, 1950	Jan. 1, 1949	Av. 1939-48
Horses	5,310,000	5,898,000	9,054,000	$ 242,879,000	$ 308,682,000	$ 634,884,000
Mules	2,153,000	2,348,000	3,450,000	214,018,000	274,012,000	429,968,000
Cattle (all)	80,277,000	78,298,000	77,600,000	9,873,710,000	10,552,421,000	5,305,578,000
Milk Cows	24,625,000	24,416,000	26,175,000	4,350,936,000	4,715,844,000	2,557,511,000
Sheep (all)	30,797,000	31,654,000	48,112,000	548,248,000	543,862,000	426,714,000
Stock Sheep	27,064,000	27,651,000	41,829,000	480,641,000	470,460,000	367,175,000
Hogs	60,424,000	57,128,000	61,634,000	1,638,964,000	2,183,553,000	1,265,915,000
Chickens	481,190,000	448,676,000	486,359,000	655,210,000	745,929,000	512,665,000
Turkeys	6,120,000	5,540,000	7,056,000	38,193,000	48,172,000	30,738,000

Based on USDA data

LIVESTOCK ON FARMS

LIVESTOCK AND POULTRY ON FARMS, JANUARY 1, (1910-49)



Based on USDA data

Livestock and poultry on farms and ranches declined slightly during 1948 to the lowest level since 1939. But, the number of all cattle increased slightly for the first time since 1945; the number of hogs on farms rose 4 per cent in the past year; and turkey numbers took a sharp jump -- up 23 per cent from 1947.

January 1 stocks of feed grains on farms were 57 per cent above last year, and the largest of record per feed-grain consuming animal unit.

CATTLE AND MILK COWS

The number of all cattle, including milk cows, increased one-half of one per cent in 1948 to a total of 78,495,000 head. Beef cattle increased 1.6 per cent, but dairy cows dropped 2 per cent.

The number of replacement heifer calves increased slightly in the past year, but one and two year old milk heifers were down 2 per cent to 5,512,000 head. Beef heifers increased 4 per cent.

Steers on farms increased 10 per cent during 1948, reflecting the large number of cattle still in feed lots at the end of the year.

The large number of cattle together with increased prices resulted in a record inventory value of $10,587,060,000. This is an increase of 16 per cent over the January 1, 1948 value of $9,094,334,000. The average value of all cattle increased from $116.00 a year ago to $135.00 this year.

Dairy cow prices increased sharply to $193.00, up $29.00 from last year.

The total number of cattle will be affected only slightly by the storm losses this winter. As of February 1, a total of 81,000 head or 1 per cent of the total cattle numbers on farms had been lost. Loss of condition, frozen teats, abortion, sterility, and other losses will total much more than death losses.

HOGS

Hog numbers increased during 1948 to 57 million head. This is 4 per cent above 1947 but 6 per cent below the 1938-47 average. Numbers are down 32 per cent from the 1944 peak but are the largest since 1946. Increases in hogs under six months and sows and gilts were responsible for the rise in hog numbers. This reflects the increase in the fall pig crop and in the farrowing intentions for the spring of 1949. Other hogs over six months old were off 7 per cent from a year ago, and were at the lowest level since 1939. The average value of $38.20 per head was down $4.60 from the record high value of

(Continued on Back)

1949 LIVESTOCK NUMBERS AND VALUES

JANUARY 1, 1949

State and Div.	All Cattle and Calves 1000s	Value Per Head	Milk Cows 1000s	Value Per Head	Hogs Incl. Pigs 1000s	Value Per Head	Stock Sheep & Lambs 1000s	Value Per Head	Horses & Mules 1000s	Value Per Head (Horses)	Value Per Head (Mules)	Chick-ens 1000s	Value Per Head
Maine	216	$129	126	$176	38	$ 32	21	$ 13	29	$112	$ —	2,602	$2.41
N. Hampshire	119	163	71	224	16	31	8	14	11	82	—	2,215	2.44
Vermont	433	175	293	225	22	29	12	14	33	70	—	962	2.42
Mass.	182	213	129	268	94	36	8	14	14	85	—	4,744	2.46
R. Island	28	227	22	268	10	36	2	14	1	90	—	549	2.35
Connecticut	171	208	117	266	36	33	6	14	11	94	—	3,357	2.33
New York	2,182	207	1,453	262	236	36	161	18	169	77	78	15,838	2.39
New Jersey	222	290	159	356	79	36	9	19	14	70	75	11,655	2.49
Pennsylvania	1,755	177	1,000	233	718	35	228	15	144	72	88	24,100	2.08
N. ATLANTIC	5,308	194	3,370	251	1,249	35	455	16	426	78	86	66,022	2.30
Ohio	2,128	146	1,060	193	3,054	34	979	15	160	59	72	18,409	1.81
Indiana	1,743	145	743	190	4,192	36	370	18	136	53	70	17,514	1.58
Illinois	3,069	152	1,021	208	5,714	43	405	19	230	50	68	21,424	1.62
Michigan	1,858	164	1,006	220	820	36	343	16	126	53	50	10,917	1.91
Wisconsin	3,766	187	2,432	235	1,619	42	196	18	265	67	63	17,349	1.70
Minnesota	3,244	157	1,516	214	3,331	48	577	16	305	54	60	26,886	1.62
Iowa	4,769	141	1,194	202	10,836	47	639	17	298	48	61	32,188	1.71
Missouri	2,959	128	956	163	3,851	36	1,054	16	486	42	68	22,488	1.45
N. Dakota	1,590	143	417	197	444	49	398	16	168	38	44	4,508	1.49
S. Dakota	2,556	139	379	200	1,551	53	808	17	197	38	52	8,435	1.44
Nebraska	3,911	135	502	201	2,403	46	179	15	271	37	52	13,605	1.44
Kansas	3,591	127	622	188	1,203	35	318	15	235	36	58	14,910	1.42
N. CENTRAL	35,184	147	11,848	207	39,018	42	6,266	17	2,877	47	66	208,633	1.60
Delaware	60	153	37	190	36	31	2	18	11	78	100	1,075	1.84
Maryland	428	160	234	205	257	31	45	18	55	76	94	4,238	1.80
Virginia	1,065	131	478	162	767	28	282	18	211	86	152	9,712	1.60
W. Virginia	532	129	227	160	284	28	293	18	95	75	84	3,955	1.54
N. Carolina	657	104	372	131	1,167	29	35	17	344	97	199	10,847	1.50
S. Carolina	357	91	174	121	620	25	4	12	177	119	194	4,780	1.59
Georgia	1,099	81	379	116	1,604	24	14	9	281	101	173	8,373	1.51
Florida	1,265	74	148	120	666	22	14	8	54	102	135	2,901	1.67
S. ATLANTIC	5,463	104	2,049	147	5,401	26	689	18	1,228	88	181	45,881	1.58
Kentucky	1,592	119	628	151	1,619	32	707	21	346	62	89	11,630	1.34
Tennessee	1,366	107	621	134	1,269	30	270	16	358	64	92	10,693	1.27
Alabama	1,198	82	413	118	1,124	26	23	11	264	75	122	7,866	1.34
Mississippi	1,522	81	527	113	975	25	100	7	403	55	96	7,393	1.25
Arkansas	1,089	95	427	127	946	26	61	12	295	41	68	6,980	1.25
Louisiana	1,332	84	318	122	724	21	127	7	241	52	89	5,000	1.55
Oklahoma	2,481	114	648	154	819	28	101	14	266	31	48	10,393	1.31
Texas	8,235	103	1,283	135	1,701	27	6,508	13	547	40	52	25,771	1.26
S. CENTRAL	18,815	101	4,865	134	9,177	27	7,897	14	2,720	48	88	85,726	1.30
Montana	1,995	141	131	205	229	42	1,923	19	167	32	56	1,896	1.70
Idaho	976	137	227	203	227	36	986	22	106	41	60	2,102	1.60
Wyoming	1,011	131	56	194	90	35	2,070	18	82	30	41	789	1.48
Colorado	1,854	134	206	200	334	35	1,185	21	131	30	54	3,385	1.50
New Mexico	1,167	127	65	180	72	29	1,393	17	94	36	42	1,180	1.54
Arizona	866	118	46	205	27	35	405	18	71	60	73	677	1.75
Utah	571	138	113	196	98	38	1,381	20	62	56	65	3,079	1.51
Nevada	546	136	22	200	28	41	458	20	37	53	65	322	1.73
Washington	885	150	329	203	168	39	338	19	64	55	61	5,279	1.91
Oregon	1,118	137	238	185	184	35	720	19	80	46	57	3,315	1.91
California	2,736	158	885	218	837	41	1,652	20	129	74	68	20,552	1.74
WESTERN	13,725	140	2,318	206	2,294	38	12,511	19	1,023	45	60	42,576	1.72
U.S.	78,495	135	24,450	193	57,139	38	27,818	17	8,274	52	117	448.838	1.66

(Continued)
$42.80 last year. The decrease in value more than offset the increase in hog numbers and lowered the total value on January 1 to $2,183,697,000.

HORSES AND MULES Horse and mule numbers declined 9 per cent in 1948, reaching a new low of 8,274,000. At the peak in 1919, there were 26,434,000 head.

SHEEP For the seventh continuous year, sheep numbers declined. Stock sheep and all sheep numbers are the lowest of record. Stock sheep numbers declined 7 per cent during 1948 to 27,818,000 head. The total value of all sheep and lambs was $548,915,000 compared with $534,679,000 last year. The average value of stock sheep reached a new high of $17.00 per head. As of February 1, 97,000 sheep and lambs have perished in the severe snow storms. This will cause a further decline in sheep numbers this year.

CHICKENS Chickens on farms, January 1, 1949, excluding commercial broilers, were 3 per cent less than a year ago and 6 per cent below the 10-year average. Although farmers raised 14 per cent fewer chickens in 1948 than in 1947 they retained a larger than usual proportion of the pullets raised in 1948. The value per bird was at a new high of $1.66 compared to $1.44 last year.

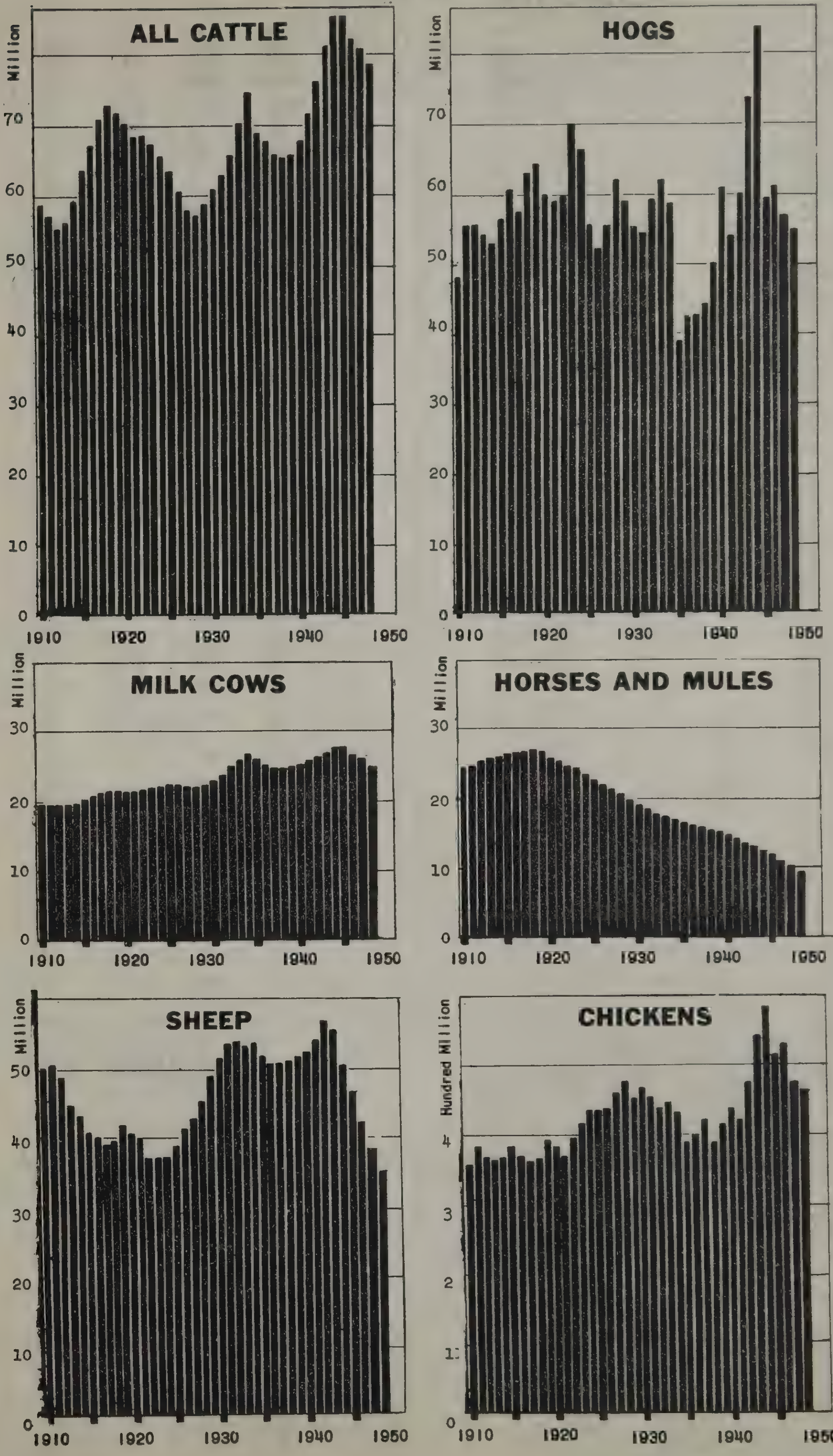
TURKEYS Numbers rose to 5,493,000 birds, 23 per cent more than a year ago, but were still 24 per cent under the 10-year average.

LIVESTOCK ON FARMS	NUMBERS			VALUES		
	Jan. 1, 1949	Jan. 1, 1948	Av. 1938-47	Jan. 1, 1949	Jan. 1, 1948	Av, 1938-47
Horses	5,921,000	6,589,000	9,495,000	$ 309,764,000	$ 365,802,000	$ 698,240,000
Mules	2,353,000	2,541,000	3,620,000	274,332,000	337,409,000	448,668,000
Cattle (all)	78,495,000	78,126,000	76,312,000	10,587,060,000	9,094,334,000	4,634,842,000
Milk Cows	24,450,000	25,039,000	26,118,000	4,723,110,000	4,102,968,000	2,280,597,000
Sheep (all)	31,963,000	34,827,000	49,736,000	548,915,000	534,679,000	404,439,000
Stock Sheep	27,818,000	29,976,000	43,329,000	473,128,000	448,851,000	349,846,000
Hogs	57,139,000	55,028,000	60,584,000	2,183,697,000	2,356,160,000	1,080,446,000
Chickens	448,838,000	461,550,000	479,166,000	745,976,000	665,227,000	475,614,000
Turkeys	5,493,000	4,450,000	7,221,000	47,681,000	30,590,000	29,195,000

Based on USDA Data

LIVESTOCK ON FARMS

LIVESTOCK AND POULTRY ON FARMS, JANUARY 1, (1910-48) -



Based on U.S.D.A. Data

The number of livestock of all species and of chickens and turkeys on farms continued to decline through 1947 reaching the lowest points since 1939.

As of January 1, 1948, the total number of animal units (excluding poultry) was 16 per cent below the 1944 peak and 4.0 per centless than a year ago.

This decline represents a reduction of 3.9 per cent in the number of feed grain consuming animal units and a 4.1 per cent decline in the number of roughage and pasture units. Including chickens, the number of feed grain consuming units was down 3.7 per cent from January 1, 1947.

Stocks of feed grains in all positions on January 1 were the lowest since 1937 and 25 per cent less than the large supply on hand a year earlier. Supply per grain consuming animal unit and poultry is about 14 per cent below the average for the previous ten years.

CATTLE AND MILK COWS

The numbers of all cattle, including milk cows, declined 3 per cent during 1947 to a total of 78,564,000 head. Both beef cow and dairy cow numbers declined in 1947 -- 3 per cent and 4 per cent respectively.

Numbers of replacement heifers between 1 and 2 years old showed little change from 1947, and now total 10,264,000. Milk heifers have increased a little over 1 per cent from last year while beef heifers decreased 2 per cent and reached the lowest point since Jan. 1, 1943.

The number of steers on farms declined 5 per cent during 1947 and is at the lowest level since 1942.

The inventory value of all cattle broke last years record by $1,242,915,000 reaching an all-time high on January 1, 1948 of $9,150 billion. The average value of all cattle increased from $97.50 a year ago to $116.00 this year. This is nearly 300 per cent higher than in 1940.

Dairy cow prices did not go up as much as in 1946, however, they also increased $19.00 and set a new high of $164.00 per head.

Agricultural Department experts say that the decline in cattle population is expected to continue for at least two more years and that beef supplies will keep shrinking for at least four years.

HOGS

Hog numbers declined during 1947 to 55 million head. This is 7 per cent below the 1937-46 average and a decrease of 3 per cent from 1946. Numbers are down 34 per cent from the 1944 peak. The big drop was in sows and gilts over 6 months of age which are down 10 per cent from a year ago. This is

1948 LIVESTOCK NUMBERS AND VALUES

JANUARY 1, 1948

State and Div.	All Cattle and Calves 1000s	Value Per Head	Milk Cows 1000s	Value Per Head	Hogs Incl. Pigs 1000s	Value Per Head	Stock Sheep & Lambs 1000s	Value Per Head	Horses & Mules 1000s	Value Per Head (Horses)	Value Per Head (Mules)	Chickens 1000s	Value Per Head
Maine	225	$114	132	$156	41	$ 30	23	$ 12	31	$120	$ --	2,458	221
N. Hampshire	123	138	73	188	16	33	8	14	12	116	--	2,378	226
Vermont	433	144	296	183	22	30	12	13	36	92	--	998	224
Mass.	186	184	132	233	91	37	9	14	16	112	--	5,208	222
R. Island	28	199	22	235	10	39	2	13	2	114	--	563	218
Connecticut	176	184	123	235	34	35	6	13	12	116	--	3,363	216
New York	2,139	177	1,439	222	221	34	171	15	184	80	80	16,624	210
New Jersey	220	232	158	282	81	36	8	16	19	77	86	10,692	220
Pennsylvania	1,721	156	990	206	711	38	230	13	171	76	88	23,566	179
N. ATLANTIC	5,251	167	3,365	214	1,227	37	469	14	483	85	87	65,850	203
Ohio	2,150	126	1,071	167	3,024	35	1,053	14	193	60	75	19,106	153
Indiana	1,798	127	774	165	3,992	42	387	16	164	51	78	17,555	135
Illinois	3,138	132	1,086	179	5,657	47	449	18	272	49	75	22,281	133
Michigan	1,840	139	1,017	184	752	39	403	15	145	50	59	11,883	163
Wisconsin	3,844	162	2,508	201	1,557	48	236	17	302	69	72	17,705	143
Minnesota	3,280	135	1,579	181	3,113	56	692	16	347	50	56	28,353	133
Iowa	4,722	127	1,270	180	9,941	56	785	17	356	47	65	34,301	137
Missouri	2,959	110	975	138	3,533	38	1,075	16	533	43	74	22,907	126
N. Dakota	1,590	126	444	173	392	58	452	15	179	36	40	5,078	127
S. Dakota	2,557	120	411	172	1,599	61	936	16	221	35	48	9,508	114
Nebraska	3,882	120	514	174	2,403	55	134	14	313	36	53	14,841	113
Kansas	3,396	114	655	164	1,094	40	342	14	275	36	59	15,544	118
N. CENTRAL	35,156	129	12,304	178	37,057	49	6,944	16	3,300	47	71	219,062	135
Delaware	61	137	38	170	39	32	2	16	13	81	100	1,123	166
Maryland	416	139	232	179	254	31	47	15	65	81	97	4,383	162
Virginia	1,066	108	469	132	790	29	290	18	221	91	153	9,952	140
W. Virginia	555	102	229	125	295	28	305	16	98	78	84	3,957	140
N. Carolina	677	86	376	109	1,191	30	35	16	361	124	219	10,532	140
S. Carolina	376	75	179	102	713	26	4	10	182	122	209	4,903	150
Georgia	1,145	64	395	94	1,654	24	14	9	295	116	197	8,639	141
Florida	1,265	59	148	100	640	23	14	8	56	102	165	2,821	162
S. ATLANTIC	5,561	85	2,066	121	5,576	27	711	16	1,291	98	199	46,310	145
Kentucky	1,592	101	616	130	1,499	35	803	18	375	71	105	11,683	112
Tennessee	1,408	90	627	115	1,308	32	307	15	379	85	122	11,017	113
Alabama	1,235	67	435	96	1,113	26	25	11	284	93	145	8,096	126
Mississippi	1,553	64	543	91	1,016	25	101	7	422	70	114	7,466	121
Arkansas	1,057	76	445	99	985	27	61	11	315	48	84	7,310	116
Louisiana	1,332	69	342	100	724	22	169	6	257	68	111	4,858	145
Oklahoma	2,479	95	704	124	731	31	130	14	298	32	55	11,259	116
Texas	8,578	89	1,351	115	1,753	32	7,557	12	631	47	68	28,352	117
S. CENTRAL	19,234	85	5,063	111	9,129	29	9,153	12	2,960	57	108	90,041	118
Montana	1,811	130	134	183	194	45	1,923	17	173	30	60	1,896	155
Idaho	930	129	234	181	206	45	1,108	20	111	43	58	2,221	148
Wyoming	1,064	117	60	167	80	40	2,344	16	95	30	41	825	137
Colorado	1,766	118	215	167	304	44	1,222	17	154	35	62	3,491	140
New Mexico	1,179	103	60	130	60	36	1,406	13	92	38	56	1,166	139
Arizona	875	105	47	168	32	38	426	14	76	60	85	731	165
Utah	533	125	115	165	79	40	1,469	17	68	56	65	3,032	147
Nevada	495	126	20	170	25	45	487	18	39	53	60	317	156
Washington	868	130	336	170	158	45	331	16	77	53	61	5,128	172
Oregon	1,077	120	243	151	164	39	735	17	89	49	60	3,467	177
California	2,764	135	903	178	747	48	1,816	17	143	87	77	19,439	164
WESTERN	13,362	123	2,367	171	2,049	45	13,267	17	1,117	47	68	41,713	160
U.S.	70,564	116	25,165	164	55,038	43	30,544	15	9,151	56	133	462,976	144

(continued)
attributed to reduced feed supplies and high feed prices plus the curtailed pig goal for 1948 and high prices for meat animals. This indicates a probable shortage in the latter part of the year and for the year 1949. Hogs under 6 months of age increased 483,000 or an increase of 5 per cent over January 1, 1947.

HORSES AND MULES The decline in horse and mule numbers was down 9 per cent again during 1947, thus reaching a record low of only 9,151,000. At the peak in 1919 there were 26,434,000 head.

SHEEP Liquidation of sheep has proceeded into its sixth year. There were only 63 per cent as many sheep on farms January 1, 1948 as on January 1, 1942. The January 1 numbers of stock sheep was the smallest since records began in 1867. Stock sheep numbers total only 30,544,000, a decline of 5 per cent during 1947. The decline in stock sheep was relatively greater for farm flocks than for range flocks. The value of stock sheep reached a new high of $15.00 per head, an increase of $2.80 over last year.

CHICKENS Reported chicken numbers are at the lowest level since 1941 -- 2 per cent below last year and flocks will be reduced by 20 per cent this year -- according to a February 1 intention report. The value per bird was unchanged from the high of $1.44 set in 1946.

TURKEYS Numbers dropped almost one-third in 1947 to 4,507,000 on January 1, 1948. The number is now just a little over one-half of the peak reached in 1946.

LIVESTOCK ON FARMS	NUMBERS			VALUES		
	Jan. 1, 1948	Jan. 1, 1947	Av. 1937-46	Jan. 1, 1948	Jan. 1, 1947	Av. 1937-46
Horses	6,607,000	7,249,000	9,904,000	$ 366,480,000	$ 428,798,000	$ 767,801,000
Mules	2,544,000	2,772,000	3,789,000	337,901,000	389,776,000	467,781,000
Cattle (all)	78,564,000	81,207,000	74,801,000	9,150,013,000	7,907,198,000	4,069,263,000
Milk Cows	25,165,000	26,098,000	25,973,000	4,126,161,000	3,787,080,000	2,026,244,000
Sheep (all)	35,332,000	37,818,000	51,039,000	542,321,000	477,296,000	387,236,000
Stock sheep	30,544,000	32,125,000	44,641,000	457,510,000	393,440,000	337,742,000
Hogs	55,038,000	56,921,000	59,200,000	2,355,609,000	2,049,066,000	926,746,000
Chickens	462,976,000	474,441,000	474,114,000	667,597,000	682,486,000	435,178,000
Turkeys	4,507,000	6,650,000	7,192,000	30,989,000	43,016,000	26,204,000

Based on U.S.D.A. Data

DOANE FEEDER CATTLE BUYING GUIDE FOR 1949

YOUR CHANCES TO "BREAK EVEN" ON FEEDER CATTLE PURCHASED THIS FALL

Cattle feeding is less hazardous this fall than a year ago. But, cattle feeding programs must be planned with care if heavy losses are to be avoided. The size of the corn crop and the general trend of prices are the two most important things to keep in mind at this time.

The Corn Crop this year is estimated at more than 3.5 billion bushels. In the past, feeder cattle prices held steady or declined (as much as 10 per cent) from August to November in years when a big corn crop followed a big corn crop.

The Price Level has held about steady for the past couple of months. We expect a lower trend to show up again by the end of September and think feeder cattle prices will decline from the levels of early September.

Fat Cattle Prices are also at or near the peak for the fall season at the present time. Experience shows that the risk of holding choice steers on feed from October until December or January is greater following a big corn crop than following a small crop.

Cash Costs are what ruin a lot of operators. At best, margins will be narrow and uncertain this year. This puts a big premium on any kind of livestock that "grow" into value. Calves and light yearlings that can use a lot of hay and pasture are the safest kind to buy in a situation like this. You may not get much for your time or receive any rent for your pasture, but you run fewer chances with your bank balance. Common Feeder Steers handled on a deferred feeding program with silage, cheap roughage, and a 30 to 45 day full feed of corn are a better bet than good or choice feeders for a winter program.

WHAT THE FEEDER CATTLE BUYING GUIDE SHOWS

The "Break Even" price shown indicates the price you must have just to keep your money together. No allowance is made for labor, use of buildings, or pasture rent. Total cash cost is based on corn at $1.00 per bushel, protein supplement at $75 per ton, silage at $10 per ton, hay at $25 per ton and allows $10 to $12 per head for salt, transportation, veterinary, death loss, maintenance, and other miscellaneous items. See also Digest page 212.

HEAVY STEERS – GOOD AND CHOICE HEAVY STEERS FOR WINTER MARKET

Weight and Method of Feeding	Length of Feed Days	Total Gain Per Head	Feed Requirements Per Head				Cash Costs Feed and Other	If Feeders Cost	To Break Even You Must Get	Doane Rating	If You Can Buy Feeders For	To Break Even You Must Get	Doane Rating
			Corn	Supplement	Silage	Hay							
			bu.	lbs.	lbs.	lbs.							
1000 lb. - Good and Choice steers -- Full Feed	100	250	30	100	None	800	$53.75	25¢	$24.30	Poor	20¢	$20.30	Fair
800-900 lb. -- Good and Choice Steers -- Full Feed	125	300	41	125	None	1050	68.81	25¢	24.46	Very Poor	20¢	20.77	Poor
800-900 lb. - Good and Choice Steers -- Full Feed	150	350	50	150	None	1300	81.87	25¢	24.53	Very Poor	20¢	20.99	Poor

Heavy feeders for the winter markets appear to be in a very hazardous position. Cash costs are always high on this class of cattle and a price margin is necessary to show a profit. Prices are likely to be lower in January and February than in November and December.

COMMON STEERS – 2 YEAR OLD COMMON STEERS FOR SPRING MARKET

700-800 lbs. -- Common Steers. Roughed on Stalk Fields and meadows until winter. Then on light feed of "cake", silage and hay until February -- Then give them a 30 to 45 day full feed of corn.	150	210	12	100	3600	500	$50.00	19¢	$20.05	Poor	15¢	$16.93	Good
	175	240	15	125	4600	600	60.19	19¢	20.47	Poor	15¢	17.44	Fair
	200	270	20	150	5600	700	72.37	19¢	21.07	Very Poor	15¢	18.12	Poor

This class of cattle seldom fails to show a little profit over feed costs. Silage is almost a necessity and we hesitate to recommend them unless there is an abundance of cheap roughage such as stalk fields, second growth meadows or unused pasture. Buy "good doing" cattle with a big frame, and finish them for market with as little cash feed as possible. Seasonal price trends favor this class of cattle.

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DOANE FEEDER CATTLE BUYING GUIDE FOR 1949

YEARLING STEERS — GOOD AND CHOICE YEARLING STEERS FOR SPRING MARKET

Weight and Method of Feeding	Length of Feed Days	Total Gain Per Head	Feed Requirements Per Head				Cash Costs Feed And Other	If Feeders Cost	To Break Even You Must Get	Doane Rating	If You Can Buy Feeders For	To Break Even You Must Get	Doane Rating
			Corn	Supplement	Silage	Hay							
			bu.	lbs.	lbs.	lbs.							
600-700 lbs. -- Good and Choice Steers -- Full Feed.	150	350	40	150	1800	500	$72.87	22¢	$21.59	Poor	18¢	$18.99	Fair
	175	395	44	175	2000	600	80.06	22¢	21.34	Poor	18¢	18.86	Fair
	200	440	49	200	2000	700	87.25	22¢	21.12	Poor	18¢	18.74	Fair

Good and choice yearling steers for the spring market are in a speculative position. If the general price level continues to decline, losses may be very heavy again this year.

STEER CALVES— GOOD AND CHOICE CALVES -- PASTURE SYSTEM FOR JULY-AUGUST MARKET

400-500 lbs. -- Good and Choice Steer Calves -- Wintered light then carried on good pasture until August.	300	400	--	210	4500	380	$47.12	25¢	$18.78	Good	20¢	$16.13	Very Good

Good and choice calves to be carried through the winter on a light feed (sufficient to keep them in condition) and then turned on good grass look like the safest kind of cattle to handle. Costs are such that you can take $3 to $5 per hundred less than you paid without being hurt. Depending on the outlook next summer these cattle can be sent on to the butcher "grass fat" when the pastures dry up or put in the feed lot.

STEER CALVES— GOOD AND CHOICE CALVES -- FULL FED ON PASTURES FOR SUMMER MARKET

400-500 lb. - Good and Choice Steer Calves -- Wintered light -- Full feed on grass after June	300	420	20	300	4500	440	$71.25	25¢	$21.12	Fair	20¢	$18.53	Good
	325	480	30	360	4500	560	85.00	25¢	21.24	Fair	20¢	18.82	Good

Good and choice steer calves to be wintered light and full fed on pasture after June 1 for August or early September markets look good if you can buy them cheap enough. There is more risk than with the same kind of calves carried on pasture without grain.

STEER CALVES— GOOD AND CHOICE CALVES -- FULL FED IN DRY LOT FOR SUMMER MARKET

400-500 lbs. -- Good and Choice Steer Calves -- Wintered light and then placed on full feed in dry lot about 150 days.	300	500	37	450	4000	920	$97.37	25¢	$22.09	Fair	20¢	$19.72	Good
	325	535	37	475	4500	1000	101.81	25¢	21.76	Fair	20¢	19.47	Good

Good and choice steer calves to be wintered light and full fed in dry lot for about 120 days carry some risk. The chances are good that you will break even on calves purchased at 20 cents but there may be little to pay for the labor.

HEIFERS — GOOD AND CHOICE HEIFERS -- FULL FED FOR SPRING MARKET

500-600 lbs. -- Yearlings Full Feed	75	170	20	100	--	600	$43.25	23¢	$23.58	Poor	19¢	$20.52	Poor
250-400 lbs. -- Heifer Calves -- Full Feed for Spring Market.	150	330	30	300	--	760	62.75	22¢	20.60	Poor	17¢	17.94	Fair
	175	380	35	350	--	840	70.62	22¢	20.28	Poor	17¢	17.80	Fair

Heifers present a difficult feeding problem and many feeders avoid them. The "heat" periods make it hard to keep heifers doing like they should, unless they are bred. For this reason the market usually discriminates heavily against any heifer weighing much over 750 pounds.

Feed Silage -- Most of these tables are set up on the basis of feeding silage. When this is not available, add 6 bushels of corn and 600 pounds of hay for every ton of silage shown in the table. Silage, in addition to being a good appetizer and regulator, reduces the average feed bill as much as $2 to $4 per head if the cattle are kept on feed for more than 3 months.

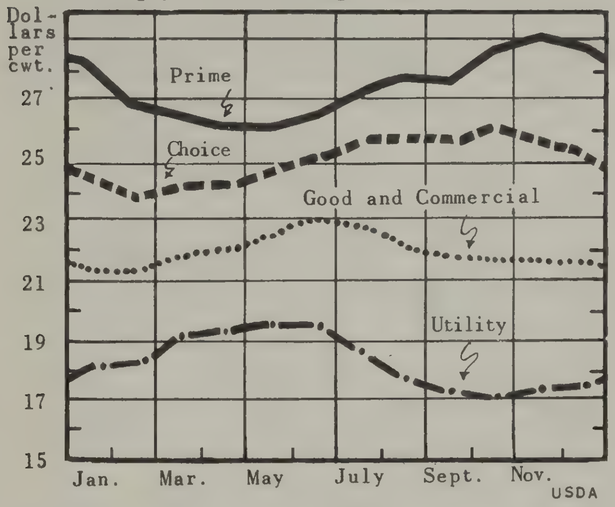
WHEN TO SELL FAT CATTLE

Feeding cattle has always carried more risk than most farm enterprises. Profits can go from "feast to famine" in a matter of months. But certain guides can help cut risks.

SEASONAL PRICE MOVEMENTS

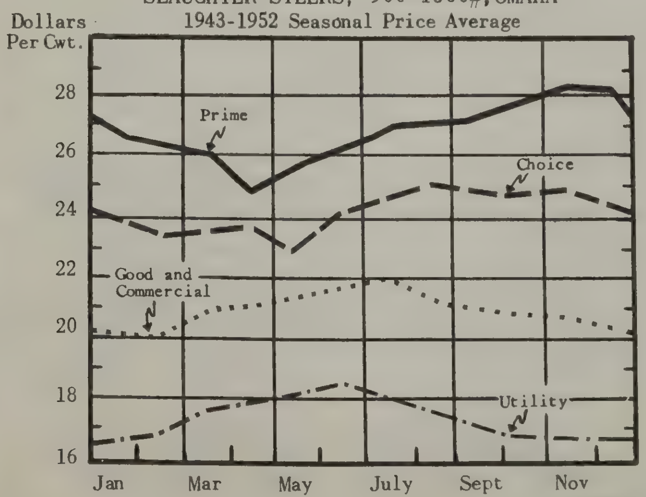
Most classes of cattle are subject to a fairly definite price pattern during the year. This is worth studying when a feeding program is being planned. At least you should try to avoid marketing when prices average lowest.

BEEF STEERS SOLD OUT OF FIRST HANDS FOR SLAUGHTE
Chicago, 1943-1952 Avg. Seasonal Price



Beef cattle prices have seasonal changes because of greater supplies in certain months. The Corn Belt program of winter feeding and selling before field work causes lower prices in the spring for better grades of fed cattle.

SLAUGHTER STEERS, 900-1300#, OMAHA
1943-1952 Seasonal Price Average



Fall is normally the time when shipments of grass cattle from the range are heaviest. Most of these grade "Good" or below, making a weakness in the price of lower grades.

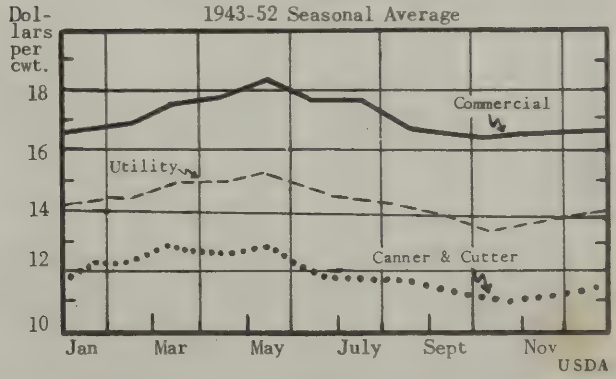
The price spread between lower and upper grades is usually narrower in the spring when better cattle are plentiful and receipts of low grades are light. The price spread is widest in the fall when fewer fed cattle are coming to market and grass shipments are heavy.

This seasonal price movement has been the basis for two of the Doane feeding programs. Lower grade animals are fed silage and some grain for spring sale. Higher quality feeders are wintered with light feed, going on pasture for fast cheap gains, and ending with a dry lot feeding period in late summer and early fall.

Heifers have about the same price movements as steers. However, it is hard to use them in a delayed feeding program. It's best to sell them soon after they reach 800 pounds, which usually means going on a spring or summer market.

Cow Prices Are Highest in the spring as grass is greening. Lowest prices come during the last 3 months of the year.

COW PRICES, KANSAS CITY
1943-52 Seasonal Average



Most cows are sold as the result of culling, rather than being marketed after a fattening period. For that reason, price is not the only guide as to when it's best to sell. Calf weaning time and your winter feed supply may set the sale date.

Veal Calves -- Normally you'll have little choice as to time of selling veal calves. High winter milk prices favor a fall-freshening dairy herd. This also puts your veal calves on the high January and February market. Lowest prices normally come in June and July. Some price slump can also be expected in November and December. The shift to more fall-freshening may tend to help June prices and cut down the February high.

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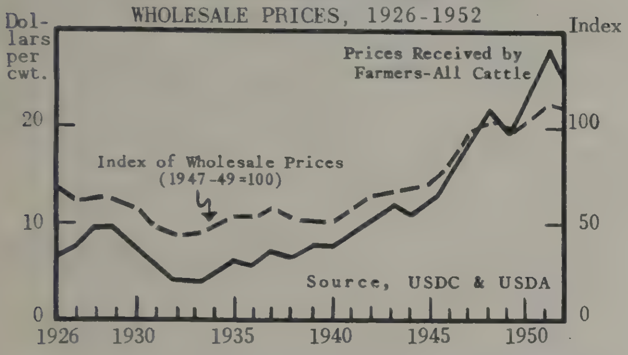
WHEN TO SELL FAT CATTLE

OTHER PRICE-MAKING FORCES

Seasonal price movements are just the starting point in predicting cattle prices. Any one of several forces can cause prices to go against the usual seasonal movement.

General Price Level is probably the biggest factor in setting all cattle prices. The graph shows that the average annual price received for all beef cattle has usually moved rather closely with the index of all wholesale prices.

ALL CATTLE PRICES & INDEX OF WHOLESALE PRICES, 1926-1952



Disposable personal income, employment numbers, and various measures of business activity are all indicators of which way cattle prices will move.

These items all relate to consumer incomes which are quickly reflected in the demand for meat. Periods of high prosperity usually bring high beef prices. Depressions, with resulting unemployment, bring weak cattle markets. Any serious lack of confidence in future business shows up in cattle prices.

Cattle Numbers on farms enter into prices bid at the stockyards. When cattle numbers have been increasing for several years, the market is much more likely to have a serious break than during a period of low cattle numbers.

Big Corn Crops or soft corn result in increased numbers of cattle on feed. Prices of better grades are lower than usual in the spring following cheap corn.

Farmer Demand for cattle has been found to have a big part in setting general cattle prices. This demand is determined more by the amount of roughage available than any other factor. Drouth forces cattle to market -- general rains in a dry area can boost cattle prices sharply.

UNFAVORABLE MARKETING DAYS

There is no evidence to show clearly that any certain day of the week is best for marketing. Receipts are normally heaviest on Monday but buyers are also very active and prices may be strong.

At Thanksgiving, Christmas, and Easter consumers may turn to fowl and buy less beef. This means that packers are less eager to buy immediately before such holidays. Also their plants are shut down on those days.

JEWISH HOLIDAYS AND KOSHER SLAUGHTERING

1953	1954	1955	1956	SLAUGHTER DAYS
MAR. 1 MAR. 31-APR. 7	MAR. 19 APR. 18-25	MAR. 8 APR. 7-14	FEB. 26 MAR. 27-APR. 3	ALL 3RD-6TH
MAY 20-21 JULY 13-21	JUNE 7-8 JULY 31-AUG. 8	MAY 27-28 JULY 20-28	MAY 16-17 JULY 9-17	NONE ALL
SEPT. 10-11 SEPT. 19	SEPT. 28-29 OCT. 7	SEPT. 17-18 SEPT. 26	SEPT. 6-7 SEPT. 15	NONE NONE
SEPT. 24-OCT. 2 DEC. 2-9	OCT. 12-20 DEC. 20-27	OCT. 1-9 DEC. 10-17	SEPT. 20-28 NOV. 29-DEC. 6	3RD-7TH ALL

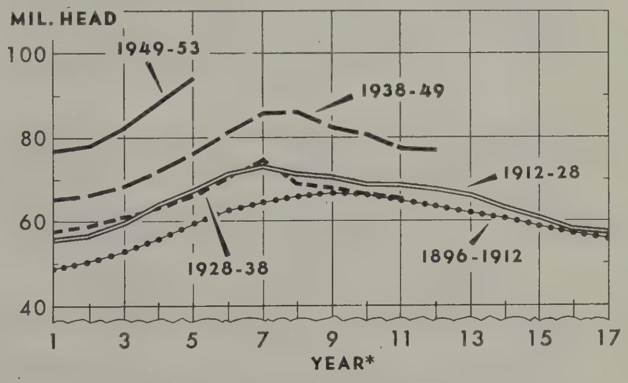
Swift & Co.

Jewish holidays have some depressing effect on prices because cattle are not slaughtered for Kosher beef on most of those days. Also none are slaughtered on Saturdays. The table shows all of the Jewish holidays from 1953 to 1956.

CATTLE CYCLES

Cattle production goes through rather definite cycles. These cycles have averaged about 15 years during the last 60 years. The graph shows that recent cycles have been shorter than early ones.

CATTLE ON FARMS, BY CYCLES



*YEAR OF CYCLE, BEGINNING FROM LOW IN NUMBERS ON FARMS.

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

The production cycle which started in 1949 may easily reach its peak in numbers during 1954, making it the shortest buildup of any recent cycle. Severe drouth has caused liquidation, cutting short the period of increase.

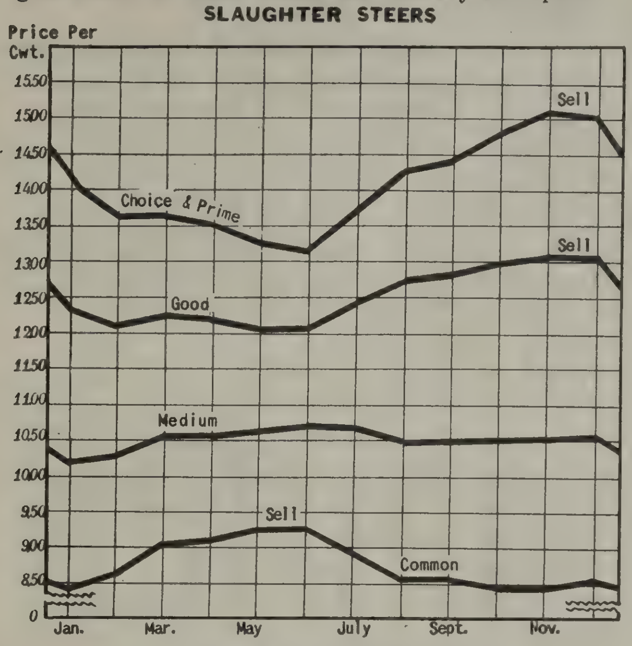
The cattle price cycle does not move exactly the same as the production cycle. Depressions, wars, or drouths can change its pattern.

In general, a peak in cattle prices is followed by a peak in numbers 4 or 5 years later. The low in cattle prices also precedes the bottom of the production cycle by about the same lapse of time. This lag is due to the time required to start breeding herds, produce calves, and fatten them out as steers or heifers.

CATTLE -- WHEN TO SELL AND BUY

WHEN TO SELL SLAUGHTER STEERS

Beef steer prices normally follow a seasonal pattern. Cattle feeders who follow a planned program based on these trends are usually well paid.



Chicago Monthly Average Prices
1100 lbs.& under, 20 years, 1928 - 1947

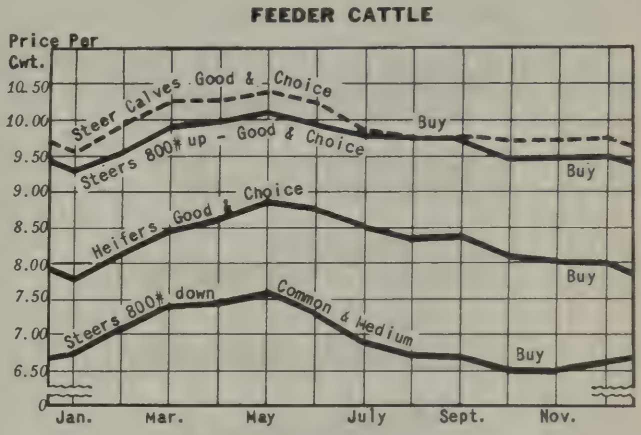
Two big factors influencing fat cattle prices are the general price level and the current trend of business. When business conditions are promising and the price level is high or rising, it is generally best to sell near or shortly after the normal seasonal peak as shown on the graph. When the business outlook is unfavorable, cattle should be sold 60 to 90 days ahead of the seasonal high as shown on the graph.

Long-time averages furnish a dependable guide for planning cattle breeding and marketing programs. But changes in production and market conditions from year to year can cause any one year to be the exception.

After considering feed costs, feed supplies and market outlook, the good cattle feeders profit most by a consistent and regular program from year to year.

WHEN TO BUY OR SELL STOCKER AND FEEDER STEERS

Although pasture and range conditions often determine or actually dictate the time of sale from the range, there are times when it is possible to avoid the peak movements of feeder stock and secure better prices.



Kansas City Monthly Average Prices
20 Years, 1927 - 1946

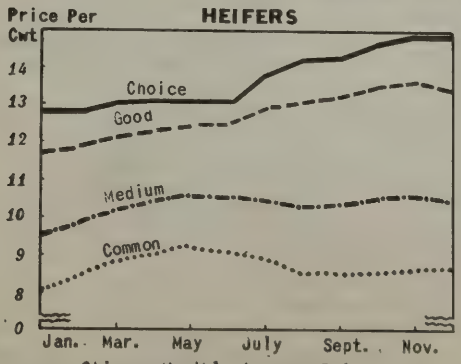
To cattle feeders these graphs are a buying guide; to the producers they are the key to the best seasonal market.

On the average, feeder steers cost over $1.00 per hundredweight more than feeder heifers. Feeding tests indicate that over a feeding period of less than 150 days heifers will fatten faster than steers. Heifers do not gain as rapidly or as economically as steers over a longer feeding period.

Cattle feeding is at best a hazardous undertaking from the standpoint of markets. No feeder can hope for financial success over a number of years without following a well planned program based on the grade of cattle handled and the feed available.

The feeder buyer when going on the market in the fall should not be misled by thinking only of top price. Heavy runs of grass cattle in the late summer and fall depress the market price on the lower grades at that season of the year. The wise buyer of feeders will discount the extreme top at the time he is buying, and think of the average price.

WHEN TO SELL FED HEIFERS AND COWS



Chicago Monthly Average Prices
14 Years, 1934-1947

DATE: U.S.D.A., B.A.E.

"The seasonal changes in the price of heifer cattle are, in the main, the same as those for steers. . .It is a little more difficult to take advantage of this situation with heifers, because there are more definite weight limitations on heifer cattle than on steers. Ordinarily heifers are discounted in price when they pass the 750-800 pound mark. Starting with heifer calves of suitable feeder-weight in the autumn, it is usually difficult to subject them to a full feeding program and carry them into the season of most favorable prices. This fact usually makes the spring and early summer market more desirable than the higher priced later fall markets for western-bred heifers that are fed. . .

"The seasonal change in prices of cows is relatively small with the late spring showing highest average prices for all grades and the late autumn the lowest prices. . .The seasonal changes occurring in the price of cows are so negligible, on the average, that the matter of convenience and usefulness of cows on the farm is the most important factor in deciding when to market." (PURDUE UNIVERSITY, BULLETIN 445).

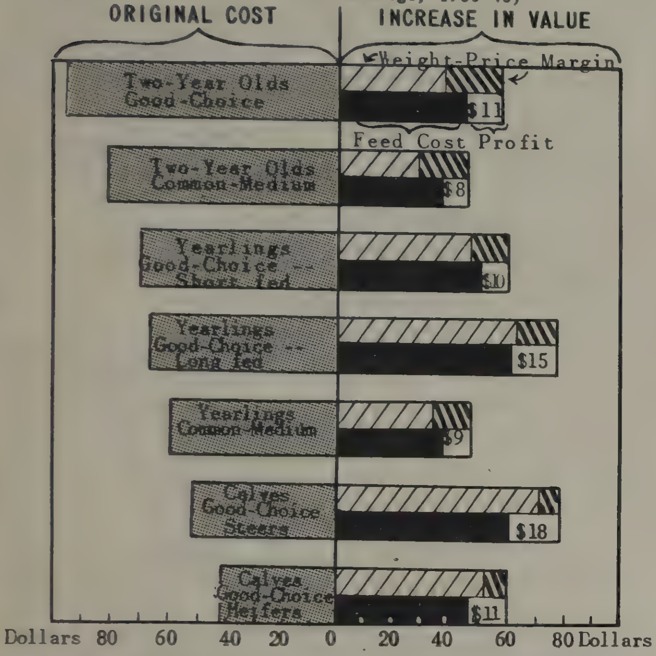
DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

CATTLE --WHEN TO SELL AND BUY

CATTLE FEEDING RISKS

On the average there is less risk in feeding calves than any other class of cattle.

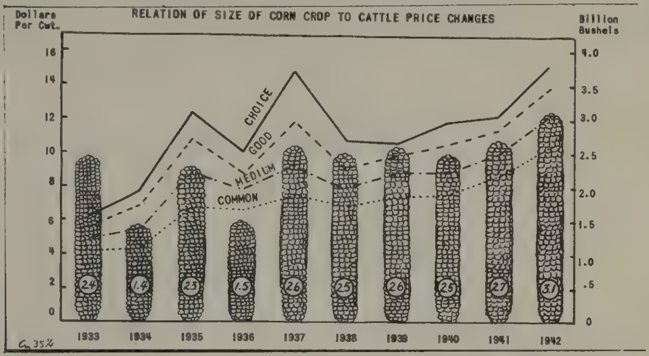
COSTS AND RETURNS FROM LIVESTOCK FEEDING
(Iowa data -6 yr. Average, 1938-43)



Most of the profit in feeding calves or light yearlings is made from the feeding operation itself. The profit from heavier feeders comes from getting a good price margin, hence, the risk. Note that heavy cattle seldom pay for their feed from the gain put on by feeding.

CATTLE PRICES AND CORN PRODUCTION

In years associated with large corn crops, feeder cattle prices tend to be higher, more fat cattle are marketed, a larger percentage of these cattle are of choice grades, the margin between prices of feeder cattle and fattened cattle is less, and the spread between grades of market cattle is smaller than in years following small corn crops.



In years following large corn crops the average price of "choice" steers was materially lower than in years following small corn crops. Also, in such years the spread in prices between grades was very narrow as compared with the years of short corn crops.

CATTLE PRICE TRENDS FOLLOWING WORLD WAR I

Selected from Kansas Bulletin 258

EARLY OR LATE FALL BUYING --Different combinations of the old and the new corn crops since 1920 have resulted in the following trends from August to November on prices of choice feeder cattle:

- A current small crop after a previous large crop has resulted in a steady to higher trend of feeder-cattle prices from August to November
- A current small crop after a previous small crop has resulted in a steady to 10 per cent downward trend of feeder-cattle prices from August to November.
- A current large crop after a previous large crop has resulted in a steady to 10 per cent downward trend of feeder-cattle prices from August to November.
- A current large crop after a previous small crop has resulted in a decline in feeder-cattle prices from August to November of 15 to 20 per cent.

SELLING EARLY OR LATE IN THE FALL -- Two factors should be considered in early August. The first is the size of the old and new corn crops; the second is the time of the peak price the previous fall. Shippers tend to hold for the period that was highest the year before, which tends to shove the peak earlier or later by 60 to 90 days than it was the previous year.

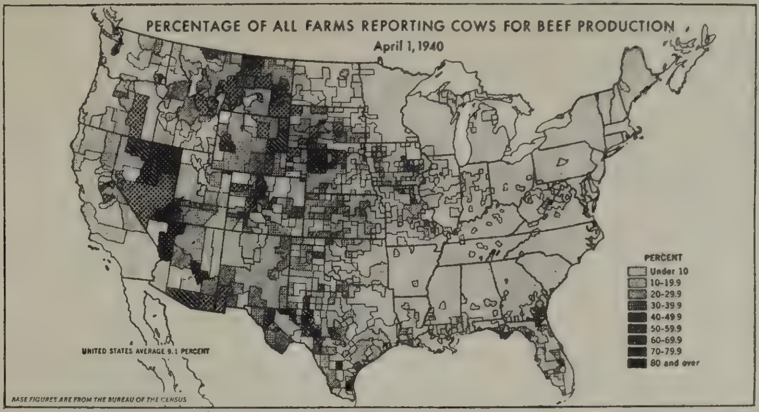
The following four combinations of the time of the peak price in the preceding year and of the size of the corn crop for the current year are apparently more responsible for the shift in the time of the peak price from August to October than any other set of factors:

- An early peak price in the previous year and a large corn crop indicates a peak price in October or November.
- An early peak price in the previous year and a small corn crop indicate a peak price in November or December.
- A late peak price in the previous year and a large corn crop indicate a peak price in August or September.
- A late peak price in the previous year and a small corn crop indicate a peak price in September or October.

CONCLUSIONS (A) It was usually more profitable to buy feeders late in the fall if there was a large corn crop that year. (B) In years following heavy winter-feeding losses, fall purchases of feeding steers rather than stockers have tended to net the greatest margin if finished for the next summer and fall market. (C) A corn crop 10 per cent larger than normal has tended to result in a supply of fed steers 15 to 20 per cent above normal at Chicago the next fall. (D) The risks in holding choice steers on feed from October to January have not been so great after small corn crops as after large corn crops.

BEEF CATTLE FACTS

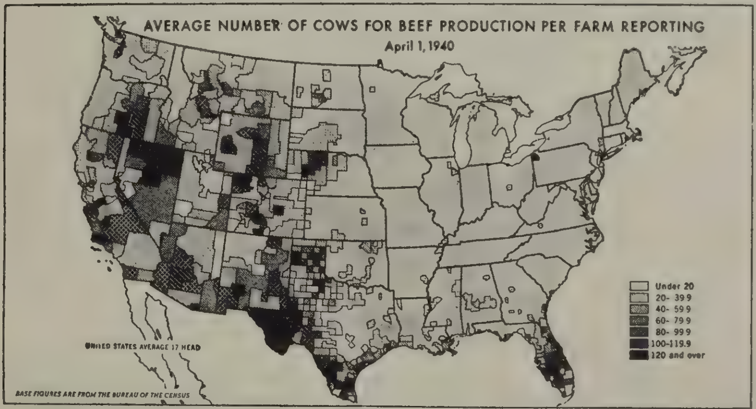
FARMS REPORTING BEEF CATTLE


PERCENTAGE OF ALL FARMS REPORTING COWS FOR BEEF PRODUCTION
April 1, 1940
PERCENT
Under 10
10-19.9
20-29.9
30-39.9
40-49.9
50-59.9
60-69.9
70-79.9
80 and over
UNITED STATES AVERAGE 9.1 PERCENT
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42991

The percentage of all farms reporting cows for production of beef is greatest in Nevada where the farms are large and few in number. Other States with several counties having 50 percent or more farms reporting cows for beef production are Montana, Wyoming, South Dakota, Nebraska, Colorado, Texas, and Arizona. Throughout most of the Dairy and Cotton Belts the percentage is less than 10. However, cows for beef production have been increasing in the lower coastal plain of Georgia and Florida, along the Gulf Coast, and western Texas and Oklahoma which are mostly within the borders of the Cotton Belt.

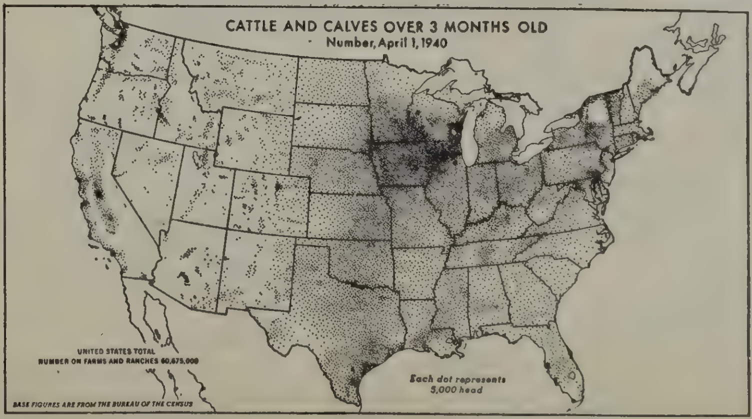
NUMBER OF BEEF COWS PER FARM


AVERAGE NUMBER OF COWS FOR BEEF PRODUCTION PER FARM REPORTING
April 1, 1940
Under 20
20- 39.9
40- 59.9
60- 79.9
80- 99.9
100-119.9
120 and over
UNITED STATES AVERAGE 17 HEAD
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42990

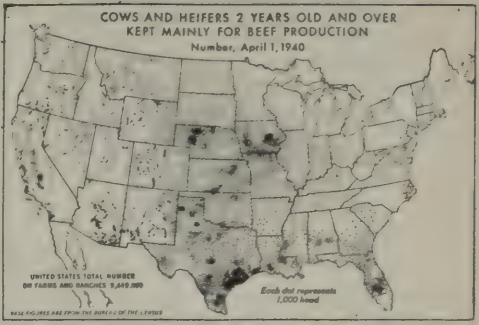
The largest number of cows for beef production per farm reporting are located on farms in the western part of the original grasslands of the country. The areas of largest numbers per farm are in the coastal prairie, the Panhandle and western Texas, the sand hills of Nebraska, in many irrigated areas with adjacent grazing land in the Western States, and on the lower coastal plain of Georgia and Florida. The extent of the black areas is not so significant in many cases when a comparison is made with the number and size of the farms in the area.

ALL CATTLE AND CALF NUMBERS


CATTLE AND CALVES OVER 3 MONTHS OLD
Number, April 1, 1940
UNITED STATES TOTAL
NUMBER ON FARMS AND RANCHES 60,675,000
Each dot represents
5,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

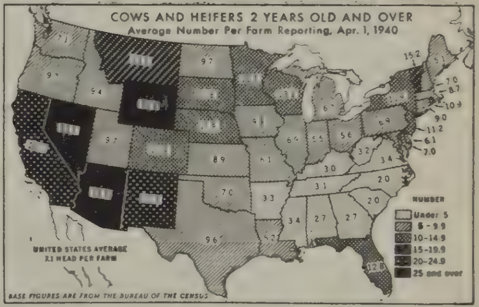
The number of cattle and calves on farms on April 1, 1940, was evenly distributed throughout most of the United States, with a heavier concentration in the western Corn and Dairy Belts. Texas had 6,282,000 head of cattle on April 1, 1940, more than any other State, but only 24 per square mile. Iowa was next, with 4,213,000 cattle, or 75 per square mile. Wisconsin had 3,237,000, or 59 per square mile, and Minnesota 3,000,000, or 39 per square mile.

COWS AND HEIFERS


COWS AND HEIFERS 2 YEARS OLD AND OVER
KEPT MAINLY FOR BEEF PRODUCTION
Number, April 1, 1940
UNITED STATES TOTAL NUMBER
ON FARMS AND RANCHES 9,449,000
Each dot represents
1,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

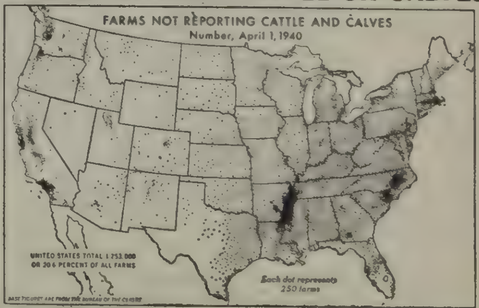
The beef cows and heifers are located in the original grassland areas of the country. The largest number are in the Great Plains and the Corn Belt area of the prairies. Areas of greatest concentration are located in the lower coastal plains and the Panhandle of Texas, southern Iowa, and the borders of the sand hills of Nebraska, eastern Kansas, northern Missouri, and the grazing areas adjacent to irrigated areas and in valleys of the Western States.

COWS AND HEIFERS PER FARM


COWS AND HEIFERS 2 YEARS OLD AND OVER
Average Number Per Farm Reporting, Apr. 1, 1940
NUMBER
Under 5
5 - 9.9
10-14.9
15-19.9
20-24.9
25 and over
UNITED STATES AVERAGE
2.1 HEAD PER FARM
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

The average number of cows and heifers 2 years old and over per farm is closely related to the size of farms in the different regions. In the Southeastern States, 2 to 4 cows were reported per farm, except in Florida which had nearly 13 cows per farm kept mainly for beef production. The average for the Dairy Belt States ranges from 6 to 12, which are kept mainly for milk production. In the Corn Belt and in most of the Great Plains States, the cows reported per farm are under 10, whereas those reported per farm in the 11 Western States vary from 7 to 62 cows.

FARMS WITH NO CATTLE OR CALVES

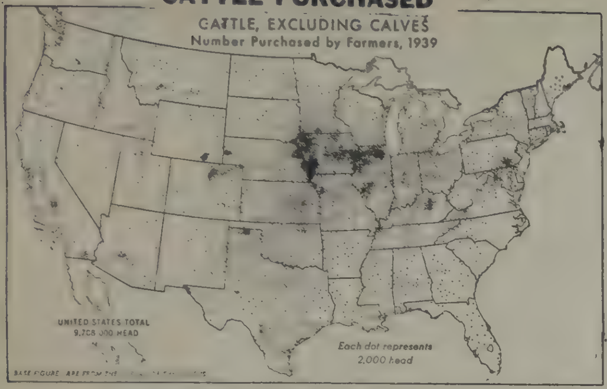

FARMS NOT REPORTING CATTLE AND CALVES
Number, April 1, 1940
UNITED STATES TOTAL 1,253,000
OR 20.6 PERCENT OF ALL FARMS
Each dot represents
250 farms
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 43007

On April 1, 1940, a million and a quarter farms were reported with no cattle or calves, or about one in every five farms in the country. The largest number of farms without cattle in any one State was reported in North Carolina; most of these were located in the tobacco area in the eastern part of the State. Mississippi was next with the largest number of reports from the Yazoo area along the Mississippi River; California was third with reports generally distributed throughout the State.

BEEF CATTLE FACTS

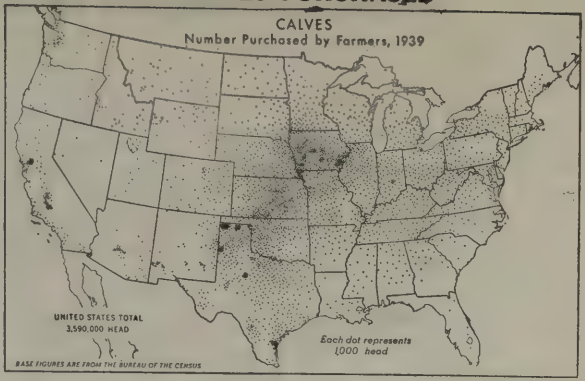
CATTLE PURCHASED



BAE 42940

In 1939, the largest numbers of cattle, excluding calves, bought by farmers, were in Iowa, Texas, and Illinois. In Iowa 1,270,800 were purchased, in Texas 978,200, and in Illinois 788,000. Cattle bought in these States and in the Flint hills of Kansas and the Missouri Valley are mostly for feeding. The largest numbers of cattle, excluding calves, are sold by farmers in the areas where they have short distances to go to slaughterhouses at the large cattle markets.

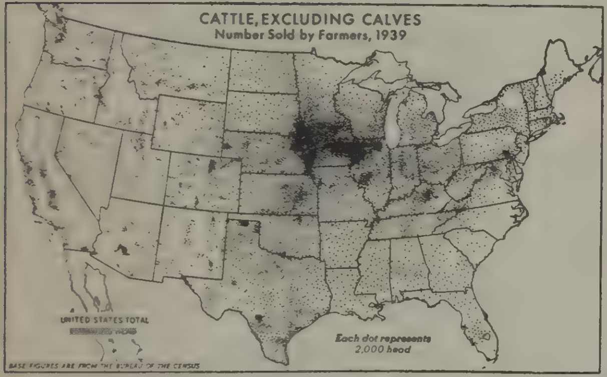
CALVES PURCHASED


CALVES
Number Purchased by Farmers, 1939
UNITED STATES TOTAL
3,590,000 HEAD
Each dot represents
1,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42983

The purchase of calves by farmers has become more common in recent years. In 1939 the farmers of Texas bought 560,100; Iowa farmers 368,700, and those in Kansas 346,700. These calves are fattened and sent to local slaughterhouses and a small percentage is slaughtered on farms for home use or for sale.

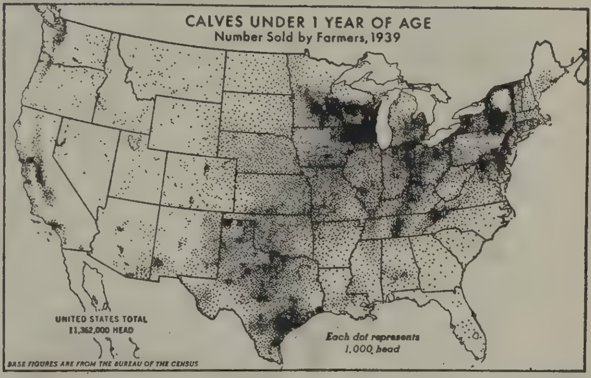
CATTLE SOLD


CATTLE, EXCLUDING CALVES
Number Sold by Farmers, 1939
UNITED STATES TOTAL
Each dot represents
2,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 39755

The number of cattle, excluding calves, sold by farmers in 1939 reached nearly 16 million head. The area of heaviest sales occurred in the beef-producing area of the western Corn Belt and the adjacent Flint Hills of Kansas. Other areas of less importance were the Bluegrass section of Kentucky; the northern Appalachian area; Lancaster County, Pa.; the northern Panhandle, El Paso County, and southern Texas; also the grazing lands adjacent to irrigated areas in the Western States.

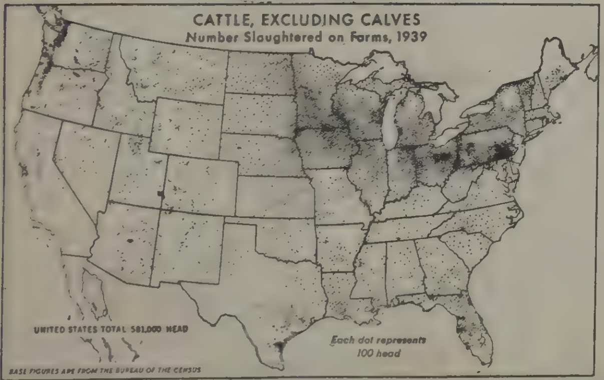
CALVES SOLD


CALVES UNDER 1 YEAR OF AGE
Number Sold by Farmers, 1939
UNITED STATES TOTAL
11,362,000 HEAD
Each dot represents
1,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 39787

In 1939, about 1,802,000 farms were reported as selling calves under 1 year of age. In Texas, which is the dominant beef-cattle State, 1,787,000 calves were sold, the largest number in any State. Wisconsin was second, with 1,056,000; New York third, with 593,000. Large numbers were also sold in the eastern Corn Belt; the limestone areas of Kentucky; Tennessee and the Virginias; and in Chester and Lancaster Counties, Pa., and surrounding territory.

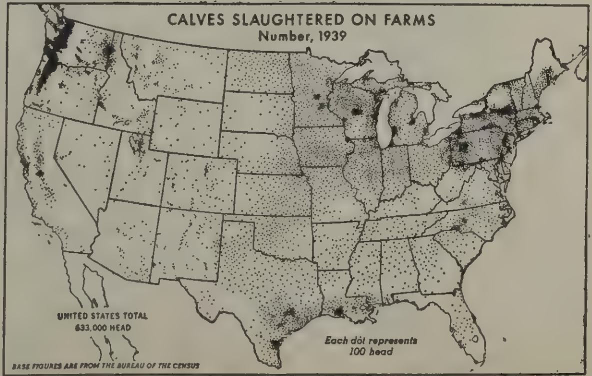
CATTLE SLAUGHTERED


CATTLE, EXCLUDING CALVES
Number Slaughtered on Farms, 1939
UNITED STATES TOTAL 581,000 HEAD
Each dot represents
100 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42861

In 1939, cattle, excluding calves slaughtered for home use or for sale on farms, were nearly 70 percent more than in 1929. Slaughtering was heaviest in the Dairy Belt, the northern and eastern Corn Belt, and in southeastern Pennsylvania in the areas around Chester and Lancaster Counties. Other areas of importance are Aroostock County, Maine, central Florida, and the southern coastal plains of Texas.

CALVES SLAUGHTERED


CALVES SLAUGHTERED ON FARMS
Number, 1939
UNITED STATES TOTAL
633,000 HEAD
Each dot represents
100 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

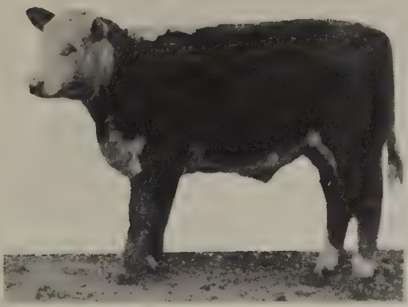
BAE 42784

The calves slaughtered in 1939 were mainly on farms in the dairy regions of Washington and Oregon; western Pennsylvania; the southern coastal plains area of Texas; and the eastern Dairy Belt States, where most of the calves were slaughtered adjacent to the large cities. Texas had the largest number slaughtered with about 49,000; Washington had 47,000; and Oregon 40,000.

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

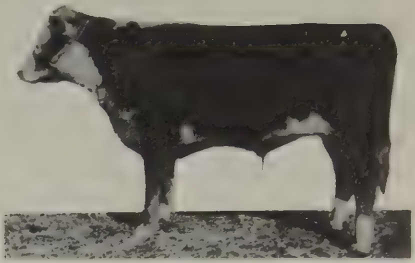
FEEDER AND STOCKER CATTLE

GRADES OF FEEDER AND STOCKER STEERS



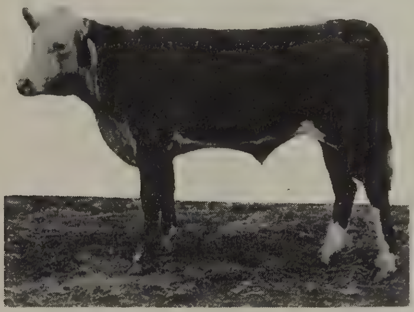
Fancy Grade Feeder And Stocker Steers

Fancy grade steers approach the ideal conformation, finish, and quality. They have exceptional thrift and vitality, and show ability to gain weight and finish rapidly. The body is very compact. The top and under line are straight and parallel.



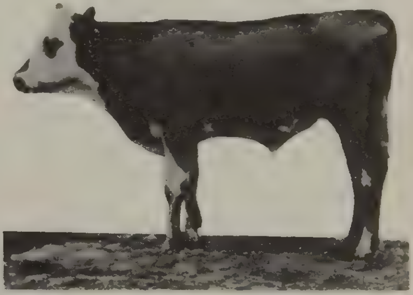
Choice Grade Feeder And Stocker Steers

Choice grade steers are very good in conformation, finish, and quality. They have the general appearance of thrift and vitality. They show ability to gain flesh and weight rapidly. The body is wide and deep in proportion to its length -- blocky.



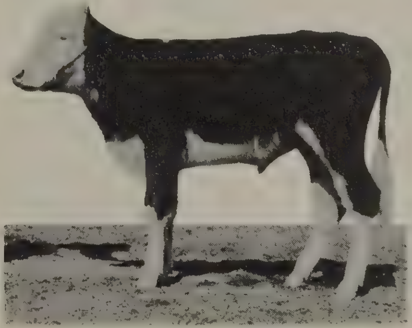
Good Grade Feeder And Stocker Steers

Good grade steers are above average in conformation, finish, and quality. They have the appearance of being thrifty but may appear slightly small for their age. The body may tend to be rangy and may be slightly long in relation to its width and/or depth.



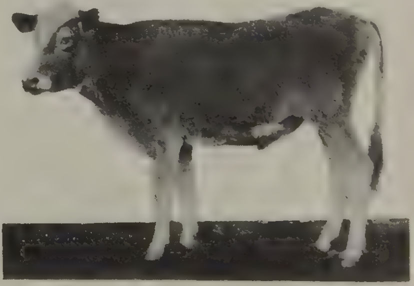
Medium Grade Feeder And Stocker Steers

Medium steers are only fair in conformation, finish, and quality. They are often a little small for their age and show only a moderate degree of thrift. Body is moderately rangy, and is often narrow and slightly shallow in relation to its length.



Common Grade Feeder And Stocker Steers

Common grade steers are poor in conformation, finish, and quality. They are small for their age and indicate a rather low degree of thrift and vitality. The body is usually decidedly rangy. It is narrow and shallow in proportion to its length.



Inferior Grade Feeder And Stocker Steers

Inferior grade steers are very deficient in conformation, finish, and quality. They indicate in their general appearance that they are very small for their age. The body is very rangy. The legs are very long in relation to the depth of the body.

Pictures from USDA

DOANE AGRICULTURAL DIGEST ®, SEPT., 1950
This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 8. Mo.

FEEDER AND STOCKER CATTLE

Feeder and stocker cattle and calves are those that show evidence of ability to take on additional weight and finish and are used for feeding or fattening purposes. When such animals are to be used for slaughter, they automatically are classified as slaughter animals and are graded accordingly.

The terms "Feeder" and "Stocker" often are used synonymously and in combination. Originally calves, yearlings and thin older cattle capable of further growth before fattening were called stockers. Older and thicker fleshed animals that went direct to the feed lot were called feeders. In recent years, a preference for small cuts of beef of high quality has encouraged the use of younger cattle as feeders.

Generally, stocker cattle are those used for further growth and weight development. Feeder cattle are those used for rapid fattening by intensive feeding.

CLASSES OF CATTLE

The classes for feeders and stockers are: steers, heifers, cows and occasionally bulls and stags. (See page 1145 for definitions.) The classes for feeder and stocker calves are steers and heifers. Heifers when fed along with steers of the same grade are finished in shorter time and at lighter weights than steers.

The market values of feeder and stocker cattle generally vary with the different age groups: calves, yearlings, 2-year olds and older. Cows, bulls, and stags are rarely grouped for sale according to ages.

Uniform weights within specified age groups of feeders and stockers are important to cattle feeders. Experienced cattlemen can estimate, with a fair degree of accuracy, the time and quantity of feed required to finish animals of uniform ages and weights.

GRADES OF CATTLE

There are six grades of feeder and stocker cattle and calves: fancy, choice, good, medium, common and inferior. The properly determined grade of a feeder and stocker animal generally indicates the grade it may attain as a finished animal. (See front)

The grade of feeder and stocker cattle is based on an appraisal of the different degrees of the following grade factors -- conformation, finish and quality.

Conformation is the build, shape, outline, or general contour of the animal and refers to the relative proportion of its parts. The degree of conformation is determined by the proportionate relationship of width, depth and length of body to each other.

Finish is the quantity and distribution of fat. The degree of finish in feeders and stockers is important because it determines the time required to fatten the animal to slaughter finish.

Quality in an animal refers primarily to its breeding and refinement. General appearance indicates that they will gain in weight and finish rapidly and will produce carcasses of exceptionally high grade if properly finished.

Of the six grades only about four grades are used to any great extent. Fancy feeders are very seldom sold in regular market channels, as a producer can generally sell them directly from his farm or ranch. The conditions of the slaughter market controls somewhat the best grades of feeder cattle. They are two-way cattle, being able to go to feed lots for further fattening or they can be slaughtered. If the markets are down at the time these best feeders are ready for sale they can go into feed lots for short term feeding -- otherwise they can be sold to packers.

Inferior grade is not often seen in feeder and stocker steers. Most steers which will be of this grade will have been sold as vealers and not too many reach the stocker-feeder stage.

The other four grades: common, medium, good and choice are more frequently observed on the market. While any of these grades may be stockers or feeders, probably the better grades will be strictly feeders and go directly into the feed lot. The lower grades will likely be stockers and will be fed roughage of some sort before going into the feed lot.

THE STEER OF TOMORROW

Feeder cattle classes as outlined in this release are acceptable for the Corn Belt feed lot and the show ring. These compact, short-legged, fine boned cattle have been bred to turn corn and other feed concentrates into beef steaks.

A new model steer designed to convert hay and pasture into beef steak is needed. We don't know exactly what he looks like, but he must answer to the name of GRASS-EATER. We do not expect the beef industry to convert over-night. There will continue to be a demand for both types of steers. The important thing is that every breeder realize that a change is coming and plan accordingly.

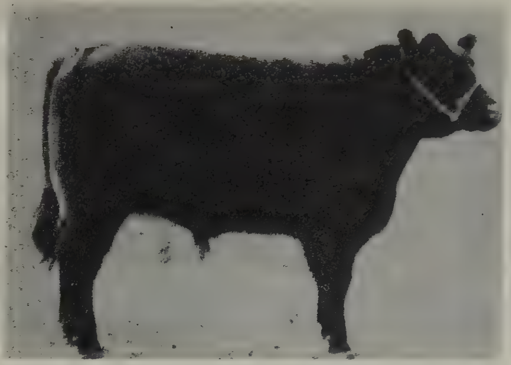
Records on steers handled under the midwest grassland system of farming show wide differences between individuals. Steers that look alike vary widely in their abilities to use grass. The average gain on good pasture during a 100 day pasture season is about 200 pounds per steer. The best steers, however, will put on 400 pounds and the poor gainers will make only 100 pounds. Seldom if ever are the big gains made by show type steers.

Here are the general requirements of the GRASS-EATER Steer of Tomorrow:

☞ Must be capable of handling a large volume of roughage -- big jaws, wide head, deep body and wide spring of ribs.

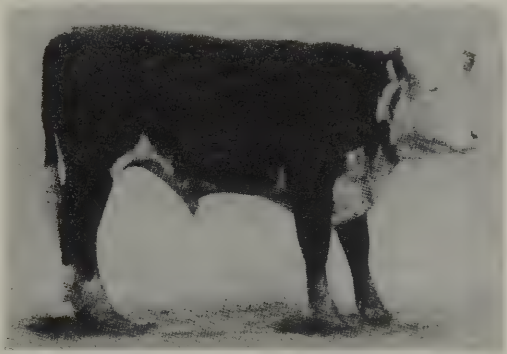
☞ Must be a rustler with big appetite and free from nervousness and flightly disposition.

GRADES OF FEEDER AND STOCKER STEERS



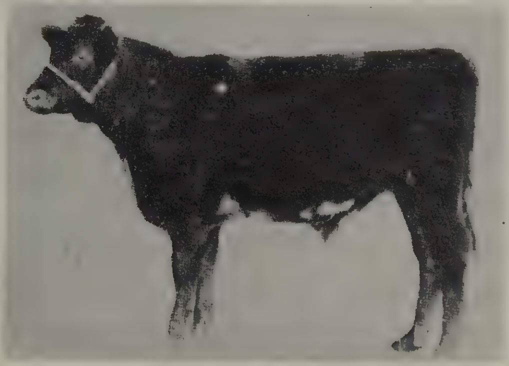
FANCY OR NO. A1 GRADE FEEDER AND STOCKER STEERS

Fancy or No. A1 grade Feeder and Stocker Steers closely approach the ideal in conformation, finish, and quality. They are relatively large for their age—breed and type considered—have the general appearance of exceptional thrift and vitality, and show ability to gain weight and finish rapidly. The body is very compact and symmetrical. It is very wide and deep in proportion to its length. The head is very short and wide, and the neck is very short. The legs are very short and set wide apart. The top line and the under line, as well as the lines of the sides, are approximately straight and parallel.



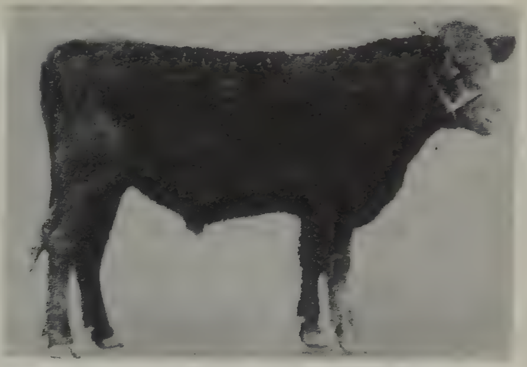
CHOICE OR NO. 1 GRADE FEEDER AND STOCKER STEERS

Choice or No. 1 grade Feeder and Stocker Steers are very good in conformation, finish, and quality. They have the general appearance of thrift and vitality. They show good growth for their age and the ability to gain flesh and weight rapidly. The body is compact and symmetrical. It is wide and deep in proportion to its length.



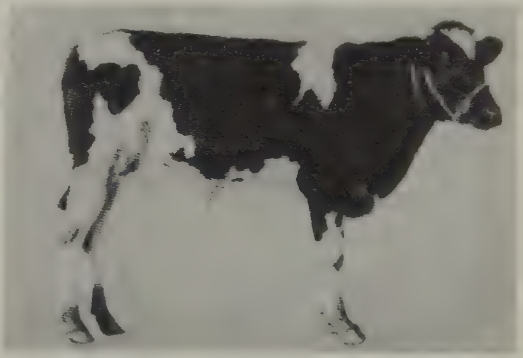
GOOD OR NO. 2 GRADE FEEDER AND STOCKER STEERS

Good or No. 2 grade Feeder and Stocker Steers are fairly good in conformation, finish, and quality. They have the appearance of being thrifty but may appear slightly small for their age. The body may tend to be rangy and somewhat unsymmetrical. It is slightly long in relation to its width, or depth, or both.



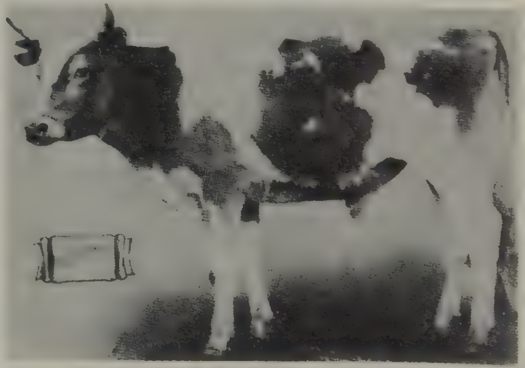
MEDIUM OR NO. 3 GRADE FEEDER AND STOCKER STEERS

Medium or No. 3 grade Feeder and Stocker Steers are usually only fair in conformation, finish, and quality. They are frequently a little small for their age—breed and type considered—and show only a moderate degree of thrift. The body is moderately rangy and unsymmetrical. The head is somewhat long in relation to its width, and the neck is moderately long in relation to the size of the body. The body is frequently moderately narrow and slightly shallow in relation to its length. The legs are somewhat long and are set relatively close together.



PLAIN OR NO. 4 GRADE FEEDER AND STOCKER STEERS

Plain or No. 4 grade Feeder and Stocker Steers are poor in conformation, finish, and quality. They are usually relatively small for their age—breed and type considered—and indicate in their appearance a rather low degree of thrift and vitality. The body is usually decidedly rangy. It is usually narrow and shallow in proportion to its length



INFERIOR OR NO. 5 GRADE FEEDER AND STOCKER STEERS

Inferior or No. 5 grade Feeder and Stocker Steers are very deficient in conformation, finish, and quality. They indicate in their general appearance that they are very small for their age—breed and type considered. The body is very rangy. The legs are very long in relation to the depth of the body and set close together.

MARKET CLASSES AND GRADES OF FEEDER AND STOCKER CATTLE

FEEDER AND STOCKER CATTLE

Cattle produced primarily for beef may, at some stage in their development after they have passed the veal stage, properly be termed "feeders" or "stockers."

In areas where feed grains are produced extensively a relatively large percentage of the beef cattle produced are grazed and fed until they have attained enough finish to allow them to be classed as slaughter animals. In areas where feed crops are not produced extensively it is customary to sell a relatively large percentage of the cattle produced as feeders or stockers before they have attained sufficient finish to be classed as slaughter animals. As beef cattle are produced extensively in the range areas of the Great Plains and Rocky Mountain States and relatively little feed grain is produced there a large percentage of the cattle are marketed as feeders and stockers.

Range feeder and stocker cattle are marketed mostly during the late summer and fall months. They are usually sold as calves, yearlings, or 2-year-olds.

Trading in feeder and stocker cattle is materially facilitated by the use of standard classes and grades whether the cattle are bought and sold through public markets, through auction markets, or direct from ranch to feed lot. The use of standard class and grade terminology enables the rancher to accurately describe the cattle he has for sale and the prospective buyer to accurately describe his requirements, thus facilitating trading on the basis of common understanding. Furthermore the use of standard classes and grades facilitates accurate price comparison and a correct interpretation of market conditions. The standard classes and grades for feeder and stocker cattle herein described have been in use for several years by the Bureau of Agricultural Economics in reporting the principal public markets at which feeder and stocker cattle are bought and sold.

DEFINITIONS OF TERMS AND CLASSIFICATIONS FOR FEEDER AND STOCKER CATTLE

The term "cattle" includes bovine animals of all ages.

Feeder and stocker cattle are those which show evidence of ability to take on additional weight and finish and which are intended for that purpose.

Class is a major market classification for Feeders and Stockers based on sex or sex condition.

CLASSES OF FEEDER AND STOCKER CATTLE

The classes of Feeders and Stockers are Steers, Heifers, and Cows. Stags and Bulls are also occasionally sold as Feeders and Stockers. These classes are defined as follows:

A Steer is a male bovine animal which was castrated before it had reached sufficient maturity to make reproduction possible and has developed physical characteristics peculiar to its class.

A Heifer is a female bovine animal which has never had a calf and which has not reached a stage of advanced pregnancy.

A Cow is a female bovine animal which has had one or more calves or which has reached an advanced stage of pregnancy.

A Bull is an uncastrated male bovine animal which has reached sufficient maturity to make reproduction possible and has developed physical characteristics peculiar to its class.

A Stag is a male bovine animal which was castrated after it had reached sufficient maturity to make reproduction possible and which has developed many of the physical characteristics peculiar to the adult uncastrated male.

AGE SELECTIONS OF FEEDER AND STOCKER CATTLE

Feeder and Stocker Steers usually are grouped according to their age into calves, yearlings, 2-year-olds and over. Feeder and Stocker Heifers usually are grouped into calves, yearlings, and 2-year-olds. Feeder and Stocker Cows are usually sold as Cows without further age segregation.

USE SELECTIONS

The determination of whether feeder and stocker calves, yearlings, 2-year-olds, or mature cattle are classed as Feeders or Stockers, within each respective class and age group, is based largely upon the purpose for which they are to be used. Those classed as Stocker cattle are usually younger and less mature, and they indicate by their general appearance that they will make more rapid gains in weight on grass or roughage but that in order to acquire a high degree of finish they will require a longer period of feeding than do Feeders. Those that are suitable for Stockers may be used as either Stockers or Feeders. However, Feeder cattle usually carry a higher degree of flesh and finish than Stocker cattle.

WEIGHT SELECTIONS

Weight selection is a subdivision of an age group based on the approximate weight of the animal. When age groups are subdivided on the basis of weight, such subdivisions result in the segregation of the animals within each age group into subgroups of animals that are of approximately uniform weight. Weight preference may vary between markets and seasons, depending upon the class of cattle and the purpose for which they are being selected. Since market practices with respect to weight preferences are not uniform, these preferences are not included in the classification of Feeders and Stockers.

CIRCULAR No. 505 Bureau of Agricultural Economics, United States Department of Agriculture

GRADE

Grade is a subdivision of a class-and-age group of feeder and stocker cattle based upon the relative degree of excellence of the animals or group of animals within each such class-and-age groups. Grading constitutes the final process of sorting and grouping and results in a more uniform group of animals than results from class and age selection.

GRADE FACTORS FOR FEEDER AND STOCKER CATTLE

The grade of feeder and stocker cattle is based on a correct appraisal of the different degrees of the following grade factors—conformation, finish, and quality. These three grade factors are present in all feeder and stocker cattle but they vary widely as between individuals. The grade of an animal represents the composite appraisal and the evaluation of all three of these major grade factors. For example, an animal may be sufficiently high in finish to grade Choice in that factor, but may be so lacking in conformation and quality that the composite appraisal of the three grade factors which determine the grade would not be higher than Medium. The three grade factors —conformation, finish, and quality—are defined as follows.

CONFORMATION

Conformation is the build, shape, outline, or general contour of the animal and refers to the degree of symmetry or relative proportion of its parts. The degree of conformation is determined by the proportionate relationship of width, depth, and length of body to each other. Animals of excellent conformation are very compact and symmetrical.

FINISH

Finish is the quantity and distribution of fat. It is dependent upon inherited tendencies, age, and sex condition, as well as upon the quantity and kind of feed the animal has consumed. The degree of finish in feeder and stocker cattle is important because of its influence upon the length of time required for an animal to attain a given degree of finish as a slaughter animal. Finish in a feeder or stocker animal also indicates, to some extent, its general thrift and inherent ability to acquire additional finish.

QUALITY

Quality in an animal refers primarily to its breeding and refinement. Animals of excellent quality usually show the characteristics of high-grade or purebred beef breeds. These factors are evidenced by certain inherent characteristics of bone, hide, head, and smoothness in relation to both frame and fleshing. The animals possess thick muscling, medium-sized bone, a mellow hide, a clean-cut well-shaped head, and a high degree of symmetry and smoothness. They indicate in their general appearance that they will gain in weight and finish rapidly and will produce carcasses of exceptionally high grade if properly finished.

STANDARDS FOR GRADES OF FEEDER AND STOCKER HEIFERS, AND COWS

Heifer grades in general conform to those of steers.

Fancy or No. A1 grade Feeder and Stocker Cows are practically ideal in conformation, finish, and quality. They are relatively young, usually 3-year-olds, possess exceptional thrift and vitality, and indicate in their general appearance the ability to make rapid gains in weight and flesh. The body is very compact and symmetrical. It is very wide and deep in proportion to its length.

Choice or No. 1 grade Feeder and Stocker Cows are very good in conformation, finish, and quality. They have the appearance of thrift and vitality and indicate in their general appearance that they will gain weight and finish rapidly. The body is compact and symmetrical. It is wide and deep in proportion to its length.

Good or No. 2 grade Feeder and Stocker Cows are fairly good in conformation, finish, and quality. They show a moderate degree of thrift and vitality. The body is moderately wide and deep in proportion to its length. The head is moderately short

Medium or No. 3 grade Feeder and Stocker Cows are usually only fair in conformation, finish, and quality. They indicate in their general appearance only a moderate degree of thrift and vitality. The body is frequently somewhat rangy, being narrow and frequently very shallow in proportion to its length.

Plain or No. 4 grade Feeder and Stocker Cows are poor in conformation, finish, and quality. They are usually lacking in thrift and vitality as indicated by their general appearance. The body is usually very rangy. It is frequently very shallow and narrow in relation to its length. The head is usually long and narrow.

Inferior or No. 5 grade Feeder and Stocker Cows are very poor in conformation, finish, and quality. They usually indicate in their general appearance that they are lacking in thrift and vitality to a marked degree. The body is usually very rangy, and is frequently very narrow and shallow in proportion to its length.

PLANNING THE CATTLE FEEDING PROGRAM

The feeds available, the equipment at hand, the feeders' experience, finances, the time when the feeding operations are to be carried on and the season when the cattle are to be finished for their grade and sold, all are factors which should help determine the kind of cattle and the way in which they are to be handled. At times the supply and comparative price levels of the various kinds and grades of cattle available and the general "outlook" situation may have much to do with the final decision as to the program to be adopted.

FITTING THE PROGRAM TO FEED SUPPLY

In deciding the kind of cattle to buy and the feeding program to be followed, probably the most important single factor is the kind and amount of feed the prospective feeder has which he wishes to market through cattle. A successful feeding program requires that the cattle shall fit the feed supply to be used.

The feeder who does not make sure of a sufficient feed supply to carry the cattle purchased to the desired time or to the desired condition often runs into grief.

Efficiency in the use of feed decreases as the age of cattle increases. The Nebraska experiment station found in 3 years' trials comparing calves, yearlings and 2-year-olds of the same breeding and carried to the same degree of finish, that the yearlings required 25 percent and the 2-year-olds 50 percent more feed than the calves per 100 pounds of gain produced.

Feed required to finish cattle of various ages

Kind of cattle and feeding period	Corn, supplement and hay ration							
	Corn		Oats		Supplement		Legume hay	
	Range bu.	Ave. bu.	Range bu.	Ave. bu.	Range lbs.	Ave. lbs.	Range tons	Ave. tons
Calves (350-400-lb. gain) 200 days	38-42	40	4-6	5	200-400	250	0.4-0.6	0.5
Yearlings (350-400-lb. gain) 175 days	35-45	40	3-5	4	150-350	230	0.5-0.7	0.6
2-yr. olds (250-350-lb. gain) 125 days	35-40	38	-	-	100-300	170	0.4-0.6	0.5

Kind of cattle and feeding period	Corn, supplement, hay and silage ration									
	Corn		Oats		Supplement		Legume hay		Corn silage	
	Range bu.	Ave. bu.	Range bu.	Ave. bu.	Range lbs.	Ave. lbs.	Range tons	Ave. tons	Range tons	Ave. tons
Calves (350-400-lb. gain) 200 days	35-40	37	4-6	5	150-400	250	0.3-0.5	0.3	0.4-0.8	0.6
Yearlings (350-400-lb. gain) 175 days	30-40	37	3-5	4	150-350	230	0.2-0.5	0.3	0.5-1.5	1.0
2-yr.-olds (250-350-lb. gain) 125 days	30-35	35	-	-	100-300	170	0.2-0.4	0.3	1.-1.75	1.5

For each additional 30 days past 200, calves will require from 8 to 10 bushels more corn. For each extra 30 days above 175, yearlings will take from 10 to 12 bushels, and for each month after the first 125 days a 2-year-old on full feed will need from 12 to 15 bushels more corn than indicated in the table. Roughage requirements are heaviest in the early months and become less in proportion to corn on longer feeds.

EQUIPMENT

Too much lot room may make steers restless. Too little will make "poor doers." It does not pay to overcrowd cattle in yards or shelter. Cattle do better when at least 90 to 100 square feet of lot and shelter are allowed for each mature steer. About one-fourth of this should be shelter. From 2½ to 3 linear feet of bunk space are also required for each mature steer without horns. Yearlings take about two-thirds as much yard and bunk space as older steers, and calves can be carried to 900 or 1,000 pounds weight in about half the space required for 2-year-olds, because they become accustomed to their quarters and to each other while small. Horned cattle, especially 2-year-olds or older, require at least a half more bunk space and rack space than dehorned or polled cattle.

Water supply must be sufficient and constant. A day or so of short water supply will cut gains and throw steers off feed as quickly and almost as surely as will radical changes in feeding. Provision should be made for keeping the water from freezing. There is no advantage in warming it further.

MARGINS

Strictly speaking, profit and margin are the same thing, but the term, "margin," in the cattle feeder's mind has come to mean the difference between the price per pound paid for the feeder steer and that received for the finished bullock.

Required margins vary somewhat with the different kinds and grades of feeders handled, with varying relations of feed to cattle prices, freight rates, length of feeding period, the skill of the feeder and a number of other factors.

When feed costs are the same the higher grades of cattle may be handled on a smaller margin than the cheaper sorts. Higher feed cost increases the cost of gain and requires a wider margin. Young cattle make cheaper gains, so the necessary margin is less. Heavier cattle usually may be handled on a narrower margin than the middle weights, because of the increase of value on a greater initial weight with a short feeding period.

The amount of margin on calves is not as important as with heavier cattle. Profit from feeding calves must come not so much from margins as from the conversion of feed into high-quality beef at a low cost. Ordinarily, the greater percentage increase in weight necessary to make a finished steer, the greater the relative importance of the factors of quality of cattle and cost of feeds as compared with probable "margins" between buying and selling prices per pound.

FEEDING PROGRAMS

Often men who have large amounts of corn or sorgo silage, or legume hay like to be free in the spring and summer to do their farm work and do not want to have cattle on hand at that time of year.

One program that fits such a set of conditions is that of buying Common or Medium steers. Such cattle may be bought in the fall at the low point of the year under average price conditions (see page 211) The most desirable weights are from 500 to 750 pounds, although heavier weights may sometimes be used. They may be run through the stalk fields, then fed heavily on silage, fodder, hay or a combination of such feeds and a protein supplement but with little or no corn at the start. A light feed of corn and cob meal or small grain may be fed through the winter. Finally, from 40 to 60 days before they are to go to market they are usually given a full feed of corn. Depending on the weight and condition of the cattle at the start and on the kind and quality of the roughage fed, such cattle can be winter fed and finished for their grade on from 15 to 25 bushels of corn per head.

A feeding program such as this brings plain cattle to market well enough finished for their grade at the most favorable season for such cattle. Marketed between the first of April and early June they find little or no competition from grass cattle or the cheaper grades of beef from other sources. A glance at the common and medium price lines for slaughter steers on chart page 211 shows that these grades sell closer to the top at this season than at any other, and at the year's top for their kind or grade.

USING ROUGHAGE WITH BETTER CATTLE

For the man who has large supplies of choice roughages such as silage and legume hay, but who also has plenty of corn and is equipped to continue his feeding operations through the summer, there are a number of possible choices.

(Continued on reverse side)

Selected sections of Bulletin P20, Feb. 1941, Iowa State College.
References to charts have been changed to Digest page 211.

PLANNING THE CATTLE FEEDING PROGRAM

Yearlings grading good or higher may be bought in the fall and handled through the winter in much the same way as outlined for the plain cattle. They must be given 2 to 4 months longer full grain feeding, however, in order to give them the higher finish required to realize on the larger investment at the start. This longer feeding brings their marketing time over into midsummer or early fall, a time on the average considerably more favorable from the selling price standpoint for cattle of the better grades. (see page 211)From 45 to 65 bushels of corn per head are required to do the job, the amount depending on the starting weight, method of handling and degree of finish desired. More often such yearlings are drylot fed, although many experienced feeders like to summer feed them on pasture. Where they are to be drylot fed, full corn feeding may be started in March. If they are to be finished on grass, full feeding is not started until they are on pasture.

Another program suited to the man who has a lot of top-quality roughage and plenty of corn and time available is that of handling good to choice steer calves. Such calves bought in the fall weighing 375 to 400 pounds may be carried through the winter in a way to use large amounts of better class roughages. Almost any sort of grain may be used in the winter ration for calves. They make good use of cracked barley, oats, corn and cob meal or shelled corn. Good growth and low-cost gains are the objectives. A light feed of from 4 to 6 pounds of grain, together with silage or chopped fodder, some good legume hay and a pound of protein concentrate makes a satisfactory ration. It will bring the calves into late winter or spring ready to be full fed in the drylot or grain fed on grass, whichever fits the feeder's conditions. Drylot feeding will finish the cattle from a month to 6 weeks sooner at somewhat lighter weights and have them ready for market in early fall. Feeding on grass will make for more growth and slightly cheaper gains and delays the finish and marketing date on such cattle until late fall or early winter. A glance at Digest page 211 will indicate that in a normal year either plan will bring the cattle into the season in which choice cattle are selling to advantage. Lightweight calves are not as good users of roughage as are the heavier ones. They must have more grain and only the best of roughage if they are to do well.

Calves will not make as efficient use of the plainer and coarser roughages as will older cattle and cannot be depended on to do much with stalk fields or even with corn or sorgo fodder unless the latter is chopped or ground. They require somewhat more in the way of shelter and careful handling than do the older steers but have the advantage of being more flexible as to length of time they may be fed and as to time of marketing.

For the man more interested in marketing corn than roughage, choice calves or yearlings purchased in the fall may be started on feed at once and full fed, finishing them at considerably lighter weights than those wintered on heavier roughage rations. Such cattle must have sufficient quality and be well enough finished so that they will not have to compete with cattle of lower grade. The length of feeding period and the amount of finish required to bring the best returns will depend a good deal on the relative quality of the cattle as well as on the market situation. The better the quality in an average year, the more profitable it is to put on more finish.

Quality is more important in the successful handling of calves than with any other cattle. In an average year only calves of at least good to choice grade will come to market with the combined finish and conformation required to sell to advantage. Plain calves handled in any of the ways suggested above have to sell in competition with grass cattle because of lack of quality, no matter how well finished they may be.

CATTLE FOR SHORT FEEDING

The handling of the better grade of heavier cattle on a short-feeding basis is a speculative enterprise. Since a quick turnover is desired the cattle are usually full corn fed, and their roughage requirements are comparatively light. A close study of probable demand and outlook conditions is desirable in connection with this type of enterprise. A favorite program among many successful speculative feeders is that of buying heavy feeders in late summer or early fall, full feeding corn and a protein supplement for 60 to 120 days and cashing them by midwinter or earlier. The time required, of course, varies with the original weight and condition of the cattle. The margin between buying and selling price is the most important factor in such a project. When satisfactory margins can be secured, this type of feeding enterprise is the most profitable of all. The man who feeds heavy cattle, however, should be able to afford to lose occasionally as well as win. On the average such a program is more likely to be successful when corn is scarce and high than when it is cheap.

YEARLING HEIFERS

The feeding of yearling heifers is only slightly less speculative than that of handling heavier short-fed cattle. Much of this difficulty lies in their seasonality. Ordinarily they can be bought only in the early fall. They must be fall or winter fed and marketed in winter or early spring. If of sufficiently choice quality, and if no calves show up, they may sometimes be carried to Kosher weight and finish, but ordinarily they should be finished at from 750 to 900 pounds in weight. There is usually no time to carry such cattle on light-grain and heavy-roughage rations in an attempt to cheapen their cost. When they can be bought at sufficient discount compared with steers of equal quality they often offer one of the best opportunities for winter short feeding. In common with other short-fed specialties, however, they need considerable margin to show a profit.

FEEDING HEIFER CALVES

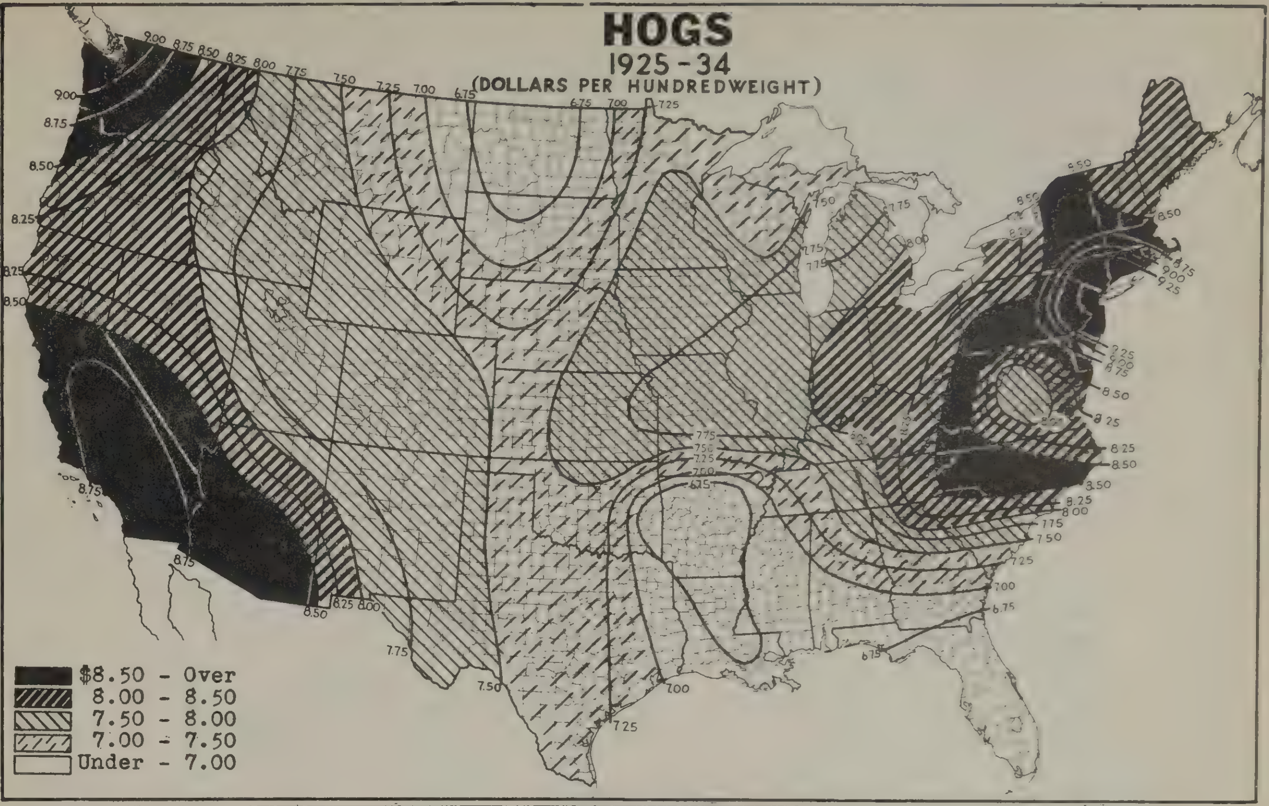
Heifer calves in many cases offer an efficient means of marketing good legume hay, small grains and corn. Such heifers of medium grade work particularly well in place of the plain steers for a winter feeding program where plenty of high-quality roughage is available. It usually pays to push the plainer heifers grading medium to good as rapidly as possible and head them for the spring market. Good to choice heifer calves may be carried a little slower through the early winter months and head for market any time between May and September. June and July are usually the months of heaviest fat heifer marketings, and it often pays to be on hand either a little earlier or a little later than this period.

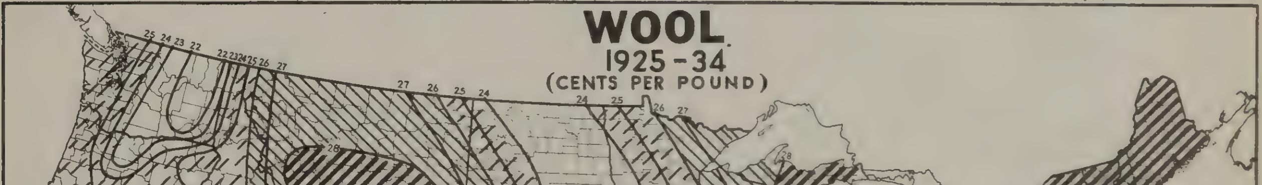
FEEDING COWS AND "HEIFERETTES"

When large supplies of cheap, rough feeds are available it is sometimes possible to utilize them to advantage with cows. A number of the canning companies feed cows as a means of making use of sweet corn cannery refuse, pea-vine silage and similar feeds. The chief advantage of cows over plain steers for such purpose is that usually the first cost is less, and they seem to be able to handle large quantities of such feed to even better advantage than the steers. While their first cost per pound usually is less, the selling price is also under that of steers of comparable grades, and the price obtained for the gains put on is therefore less than with the steers. Of all cattle, old cows, such as ordinarily may be obtained as feeders, are the least efficient users of feed. They ordinarily require close to twice as much feed per 100 pounds of gain as it takes for yearling heifers. Because of comparatively low final selling price and heavy feed requirements a good margin is ordinarily required in feeding such cows. Bought in the fall and winter and fed for the late winter and spring market they usually have the advantage of some market rise.

Young cows or "heiferettes" make much more efficient use of feed than do old cows and usually sell at enough higher price so that they may be handled on a narrower margin between first cost and selling price per pound. Because of the practical certainty that a high percentage will be in calf, they cannot be carried for as long a time as steers and must be pushed along more rapidly on heavier grain feeding.

Selected sections of Bulletin P20, Feb. 1941, Iowa State College. References to charts have been changed to Digest page 211 which has graphs and charts.


HOGS
1925-34
(DOLLARS PER HUNDREDWEIGHT)


WOOL
1925-34
(CENTS PER POUND)

U. S. DEPARTMENT OF AGRICULTURE

HOGS — Average prices received by farmers for hogs, by crop reporting districts, 1925-1934 (Dollars per cwt.)

State	Crop reporting district																	
	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	9.26	-	-	8.35	-	8.62	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.33
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.27
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.61
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.29
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.18
New York	-	-	-	8.66	-	9.25	8.09	-	8.69	-	9.07	-	7.97	7.99	9.76	10.60	-	-
New Jersey	-	-	-	9.34	-	-	-	-	9.18	-	-	-	-	9.62	-	-	-	-
Pennsylvania	8.38	-	-	8.18	-	8.95	8.64	-	9.02	-	9.67	-	8.61	8.74	9.55	-	-	-
Ohio	8.09	-	-	8.18	-	8.23	8.29	-	8.26	-	8.28	-	8.45	8.34	7.97	-	-	-
Indiana	8.01	-	-	8.14	-	8.24	8.26	-	8.36	-	8.29	-	8.18	8.20	8.29	-	-	-
Illinois	7.88	-	-	-	-	7.92	8.07	8.06	8.01	-	7.80	7.90	7.89	-	7.81	-	-	-
Michigan	8.38	-	-	7.73	-	7.82	7.76	-	7.79	-	7.81	-	8.01	8.02	8.16	-	-	-
Wisconsin	7.34	-	-	7.40	-	7.40	7.59	-	7.31	-	7.69	-	7.60	7.75	8.02	-	-	-
Minnesota	7.07	-	-	7.48	-	7.57	7.53	-	7.75	-	7.63	-	7.49	7.73	7.82	-	-	-
Iowa	7.59	-	-	7.64	-	7.59	7.53	-	7.65	-	7.73	-	7.61	7.77	7.76	-	-	-
Missouri	7.92	-	-	7.83	-	7.92	7.82	-	7.90	-	8.14	-	7.56	7.03	7.50	-	-	-
North Dakota	6.74	-	-	6.58	-	6.81	6.66	-	6.80	-	7.06	-	6.86	6.72	6.95	-	-	-
South Dakota	6.70	-	-	7.09	-	7.27	7.10	-	7.38	-	7.50	-	7.09	6.92	7.48	-	-	-
Nebraska	7.27	-	-	7.19	-	7.41	-	-	7.47	-	7.56	-	7.37	7.48	7.49	-	-	-
Kansas	7.50	-	-	7.57	-	7.55	7.45	-	7.57	-	7.80	-	7.42	7.70	7.76	-	-	-
Delaware	-	-	-	8.97	-	-	-	-	8.71	-	-	-	-	9.51	-	-	-	-
Maryland	8.80	-	-	8.84	-	8.74	8.98	-	8.36	-	9.10	-	-	-	-	-	-	-
Virginia	-	-	-	7.96	-	-	8.11	-	8.09	-	8.73	-	8.36	8.60	8.10	-	-	-
West Virginia	7.84	-	-	8.74	-	8.02	8.28	-	8.82	-	8.45	-	-	9.52	-	-	-	-
North Carolina	9.17	-	-	9.65	-	8.17	8.63	-	8.96	-	8.66	-	-	8.94	8.75	-	-	-
South Carolina	8.52	-	-	8.26	-	8.32	8.22	-	7.67	-	-	-	-	7.14	-	-	-	-
Georgia	8.20	-	-	8.20	-	8.19	7.62	-	7.37	-	6.98	-	7.15	6.95	6.76	-	-	-
Florida	6.82	-	-	-	-	6.62	-	-	6.76	-	-	-	-	6.95	-	-	-	-
Kentucky	7.63	-	-	7.82	-	7.80	8.22	-	8.19	-	8.36	-	-	-	-	-	-	-
Tennessee	7.43	-	-	7.29	-	7.52	7.72	-	7.87	-	8.35	-	-	-	-	-	-	-
Alabama	8.03	-	-	7.50	8.18	8.09	7.04	-	6.80	-	7.62	-	7.03	6.60	6.83	-	-	-
Mississippi	7.29	-	-	6.66	-	6.97	7.28	-	7.43	-	6.96	-	6.70	7.43	6.94	-	-	-
Arkansas	6.69	-	-	6.19	-	6.49	6.72	-	6.98	-	6.60	-	6.74	6.58	6.46	-	-	-
Louisiana	7.60	-	-	6.98	-	6.28	7.29	-	6.56	-	6.61	-	7.09	7.80	7.99	-	-	-
Oklahoma	7.26	-	-	7.55	-	7.18	7.54	-	7.63	-	6.61	-	7.59	7.05	6.44	-	-	-
Texas	-	7.51	7.70	7.44	-	7.63	7.47	-	6.89	-	7.94	-	7.57	7.20	7.19	-	7.32	-
Montana	7.91	-	-	7.74	-	6.94	-	-	7.77	-	-	-	7.83	7.42	7.18	-	-	-
Idaho	8.33	-	-	-	-	-	-	-	-	-	-	-	7.88	7.73	7.47	-	-	-
Wyoming	7.34	-	-	7.16	-	7.86	8.28	-	7.39	-	-	-	-	-	-	-	-	-
Colorado	7.46	-	-	7.79	-	7.18	7.58	-	7.64	-	7.08	-	7.53	7.73	7.53	-	-	-
New Mexico	7.79	-	-	-	-	7.31	-	-	-	-	-	-	7.84	-	8.14	-	-	-
Arizona	-	-	-	8.63	-	-	-	-	8.79	-	-	-	8.17	-	8.51	-	-	-
Utah	7.98	-	-	-	-	-	-	-	7.66	-	7.54	-	7.56	-	-	-	-	-
Nevada	8.32	-	-	-	-	8.98	-	-	-	-	-	-	-	8.69	-	-	-	-
Washington	9.13	-	-	8.19	-	8.48	-	-	8.44	-	-	-	-	-	8.09	-	-	-
Oregon	8.51	-	-	8.16	-	7.97	-	-	-	-	-	-	8.29	8.05	-	-	-	-
California	8.51	-	-	7.98	-	8.13	8.68	-	8.52	8.77	8.82	-	-	9.10	-	-	-	-

WOOL — Average prices received by farmers for wool, by crop reporting districts, 1925-1934 (Cents per pound)

State	Crop reporting district																	
	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	30	-	-	31	-	30	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29
New York	-	-	-	30	-	30	29	-	29	-	30	-	30	30	30	26	-	-
New Jersey	-	-	-	30	-	-	-	-	30	-	-	-	-	*	-	-	-	-
Pennsylvania	31	-	-	31	-	32	31	-	30	-	29	-	31	30	29	-	-	-
Ohio	29	-	-	30	-	31	29	-	30	-	32	-	30	30	31	-	-	-
Indiana	27	-	-	30	-	28	28	-	28	-	30	-	30	32	31	-	-	-
Illinois	27	-	-	-	-	26	29	29	26	-	25	29	27	-	29	-	-	-
Michigan	28	-	-	28	-	30	29	-	29	-	29	-	29	29	29	-	-	-
Wisconsin	26	-	-	29	-	28	28	-	28	-	29	-	28	29	29	-	-	-
Minnesota	25	-	-	28	-	28	23	-	25	-	26	-	23	26	28	-	-	-
Iowa	25	-	-	26	-	27	26	-	27	-	28	-	27	28	28	-	-	-
Missouri	27	-	-	28	-	28	27	-	28	-	28	-	28	27	27	-	-	-
North Dakota	23	-	-	23	-	23	25	-	23	-	23	-	28	25	23	-	-	-
South Dakota	28	-	-	23	-	24	24	-	26	-	24	-	27	24	23	-	-	-
Nebraska	24	-	-	24	-	24	-	-	22	-	22	-	22	21	22	-	-	-
Kansas	23	-	-	24	-	25	24	-	25	-	25	-	21	23	25	-	-	-
Delaware	-	-	-	30	-	-	-	-	30	-	-	-	-	28	-	-	-	-
Maryland	31	-	-	29	-	31	31	-	30	-	32	-	-	-	-	-	-	-
Virginia	-	-	-	31	-	-	32	-	29	-	29	-	31	29	27	-	-	-
West Virginia	31	-	-	33	-	32	30	-	32	-	32	-	-	31	-	-	-	-
North Carolina	32	-	-	23	-	28	28	-	30	-	28	-	-	27	25	-	-	-
South Carolina	27	-	-	25	-	25	24	-	*	-	-	-	-	22	-	-	-	-
Georgia	26	-	-	28	-	29	27	-	27	-	27	-	24	25	26	-	-	-
Florida	29	-	-	-	-	*	-	-	23	-	-	-	-	*	-	-	-	-
Kentucky	29	-	-	29	-	29	33	-	32	-	30	-	-	-	-	-	-	-
Tennessee	25	-	-	26	-	28	29	-	29	-	29	-	-	-	-	-	-	-
Alabama	27	-	-	27	29	22	21	-	26	-	29	-	25	27	26	-	-	-
Mississippi	*	-	-	26	-	25	24	-	24	-	25	-	24	26	27	-	-	-
Arkansas	25	-	-	25	-	23	24	-	25	-	22	-	24	22	22	-	-	-
Louisiana	23	-	-	23	-	23	25	-	25	-	25	-	25	26	23	-	-	-
Oklahoma	23	-	-	22	-	26	21	-	21	-	23	-	22	22	22	-	-	-
Texas	-	23	26	25	-	25	26	-	25	-	27	-	27	23	23	-	22	-
Montana	27	-	-	27	-	27	-	-	27	-	-	-	29	28	28	-	-	-
Idaho	26	-	-	-	-	-	-	-	-	-	-	-	26	26	27	-	-	-
Wyoming	24	-	-	28	-	28	27	-	27	-	-	-	-	-	-	-	-	-
Colorado	26	-	-	26	-	25	27	-	24	-	23	-	25	21	23	-	-	-
New Mexico	21	-	-	-	-	22	-	-	-	-	-	-	22	-	22	-	-	-
Arizona	-	-	-	19	-	-	-	-	23	-	-	-	*	-	*	-	-	-
Utah	26	-	-	-	-	-	-	-	25	-	25	-	25	-	-	-	-	-
Nevada	24	-	-	-	-	28	-	-	-	-	-	-	-	25	-	-	-	-
Washington	25	-	-	23	-	22	-	-	22	-	-	-	-	-	22	-	-	-
Oregon	27	-	-	24	-	25	-	-	-	-	-	-	28	24	-	-	-	-
California	29	-	-	25	-	25	25	-	24	22	25	-	-	22	-	-	-	-

* Data not available.

MARKETING FEEDER CATTLE

Marketing cattle is one of the toughest jobs. For a top sale ranchers must know:

- The grade and class of cattle he has to sell.
- The bids being offered for these kinds of cattle.

It's necessary to be familiar with grade, class, weight and potential shrink. One of the best ways to get better acquainted with cattle grades is to spend time with commission salesmen, order buyers, and market news reporters.

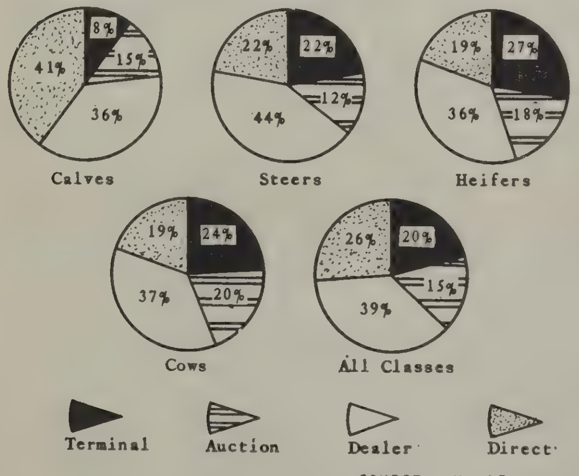
Have them point out grades to you as reported in the market news. Put page 213 of the Digest to work. It shows grades and classes of feeders and stockers. Learn to be an unbiased judge of your stock. This is the only way to know whether or not you're making a good sale.

Watch cattle on the scales -- estimate their weights before sale -- check these with the scales. Keep records of the average weights of the cattle you sell each fall.

MARKET OUTLETS

Know the market outlets. The four most important in the West are the terminal markets, the local auction markets, country buyers, and direct sales to the ultimate purchaser. Each market has its own advantages and disadvantages. That's why cattlemen use them differently as shown below.

MARKET OUTLETS USED BY RANGE OPERATORS
1948-49



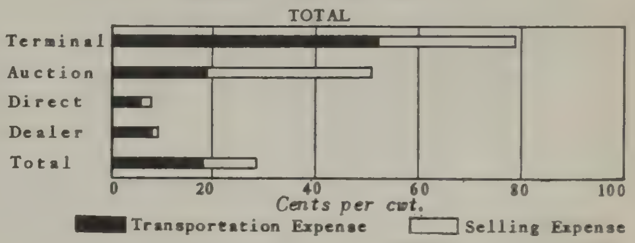
SOURCE: U. OF WYOMING

The Terminal Market is most often used by the larger producers. They can sort their cattle better before sale and benefit from the price premium allowed for good stock at a highly competitive market.

Smaller operators can best use the terminal markets by forming marketing pools locally and shipping uniform lots. Better quality cattle more often bring their best price when sold through a highly organized terminal market.

The big disadvantage of the terminal markets is marketing expense. It usually averages higher than at other market outlets. The higher marketing cost at the terminal market is usually reflected in higher prices per hundredweight for most animals sold. These extra costs are justified when better grades are recognized and given a premium.

MARKETING EXPENSE PER CWT.
Western Region, 1948-49



SOURCE: U. OF WYOMING

Auction Markets A major advantage of the auction market is convenience. It is usually close to the home ranch, and a better market for small or mixed bunches of medium to lower grade cattle. Marketing costs are considerably lower here than at terminal markets, primarily because of location. Shipping costs are lower. Selling costs, commission fees, feed and yardage are higher because auction facilities are used only once or twice weekly.

Dealers take a larger number of the range cattle than any other market outlet.

At country points the better grades of cattle either aren't recognized or are denied the premium they should bring. Dealers coming into an area will not buy the best cattle and pay full market value for them. They know human nature. Other producers would feel their cattle were just as good as those on which a premium was paid and would expect the same deal.

Better grade cattle often sell for less than they are worth at country points -- poorer grade cattle may bring more than they should.

Direct Selling costs the least of any other market outlet. It is an especially good way to market calves because the terminal market auctions charge just as much or two-thirds as much yardage for a calf as for a cow. Another point in favor of direct selling, pencil shrink usually isn't required. Direct marketing usually means best prices, especially for calves.

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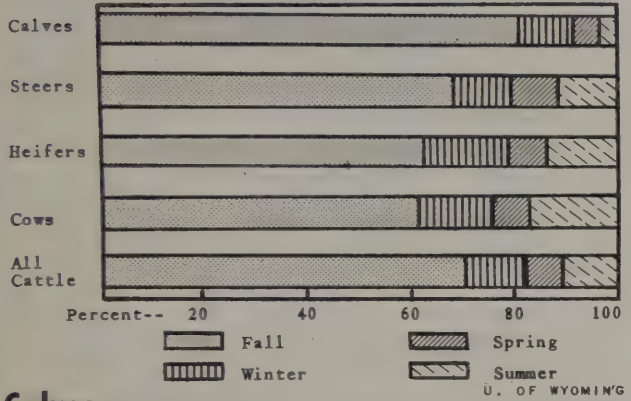
MARKETING FEEDER CATTLE

SALE TIME

Range cattle offerings show a somewhat similar pattern yearly. Prices tend to be highest in spring when supplies are lightest, lowest in the fall when supplies are largest.

WHEN RANGE CATTLE ARE MARKETED
Western Region 1948-49



U. OF WYOMING

Calves show the greatest seasonal price movement of any class. Over four-fifths of the calves are usually sold in the fall with October sales the heaviest. Prices suffer accordingly.

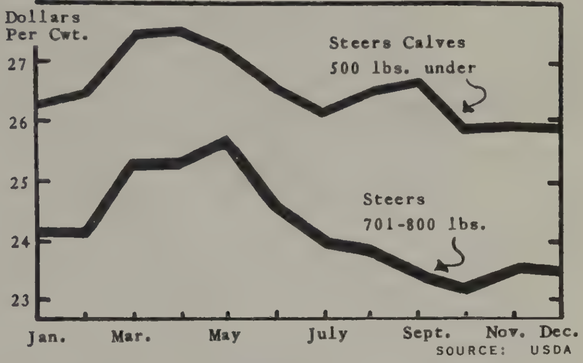
Prices take a long slide downward from spring until fall. Calves contracted in early summer or marketed before or after the biggest fall runs usually bring higher prices.

Steers And Heifers are also marketed in greatest numbers in the fall -- steer sales being slightly more concentrated. The price movement is similar to that for calves, but fluctuations are more irregular -- rising higher in the spring, falling lower in the fall.

Shrink Allowance varies by area and by markets. Sales to dealers and directly to farmers are often made with no shrink allowance. This is not always a sign of a good sale. If shrink isn't allowed, the price received for the cattle must necessarily be lower.

The typical rate of shrinkage is 3 percent. This may be lower in the short grass areas and higher in the forest areas. Sometimes cattle are held off feed and water from 1 to 3 hours or longer before being sold. Buyers and sellers should agree before sales on a specified pencil shrink or a specified time for off-feed.

MONTHLY PRICES STEERS AND CALVES
Kansas City 1947-51 Average



SOURCE: USDA

Handling Before Shipping. All cattle should be sorted carefully -- the more quietly the better. Livestock shipped in straight loads shrink less. Calves should be left on the cow right up to the time they are loaded if sale is at weaning time.

WHAT MUST CALVES BRING

The earnings of your cow and calf herds depend largely on the percentage calf crop and the average weight of calves at marketing.

Livestock economists at Montana State College have done work to illustrate clearly how these two factors affect earnings. The table below shows the cost of the average range calf and what it must sell for. The table is set up on the basis of the herd cow costing either $62.50 or $50 annually. This is within the range of costs for most operators.

The top figure in each square is the pounds of calf produced per cow. The lower figure is the cost per pound of calf.

For Example:

$$\frac{90\% \times 450\#}{\$62.50 \div 405} = \frac{405 \text{ pounds}}{15.4 \text{ cents}}$$

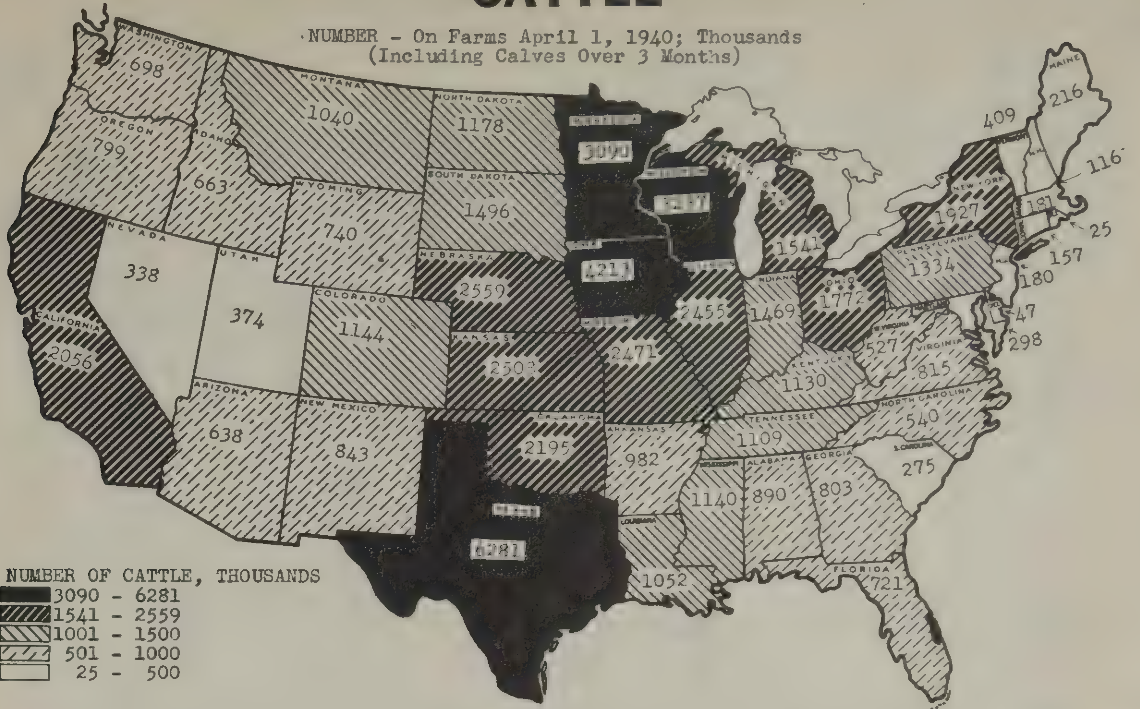
COST PER POUND OF CALF TURN-OFF

Percentage Calf Crop	Operating cost - $62.50 per cow						Operating cost - $50.00 per cow					
	Calf Weights											
	450#	425#	400#	375#	350#	325#	450#	425#	400#	375#	350#	325#
90%	405 15.4	382 16.3	360 17.2	337 18.4	315 19.8	292 21.3	405 12.3	382 13.1	360 13.9	337 14.8	315 15.8	292 17.1
80%	360 17.2	340 18.4	320 19.5	300 20.8	280 22.3	260 24.0	360 13.9	340 14.7	320 15.6	300 16.6	280 17.4	260 19.2
70%	315 19.6	297 21.0	280 22.0	262 24.0	245 25.5	227 27.0	315 15.8	297 16.8	280 17.9	262 19.1	245 20.4	227 21.8
60%	270 23.4	255 24.5	240 26.0	225 27.8	210 29.8	195 32.0	270 18.9	255 19.5	240 20.8	225 22.2	210 23.8	195 25.6

SOURCE: MONTANA STATE COLLEGE

CATTLE

NUMBER - On Farms April 1, 1940; Thousands
(Including Calves Over 3 Months)

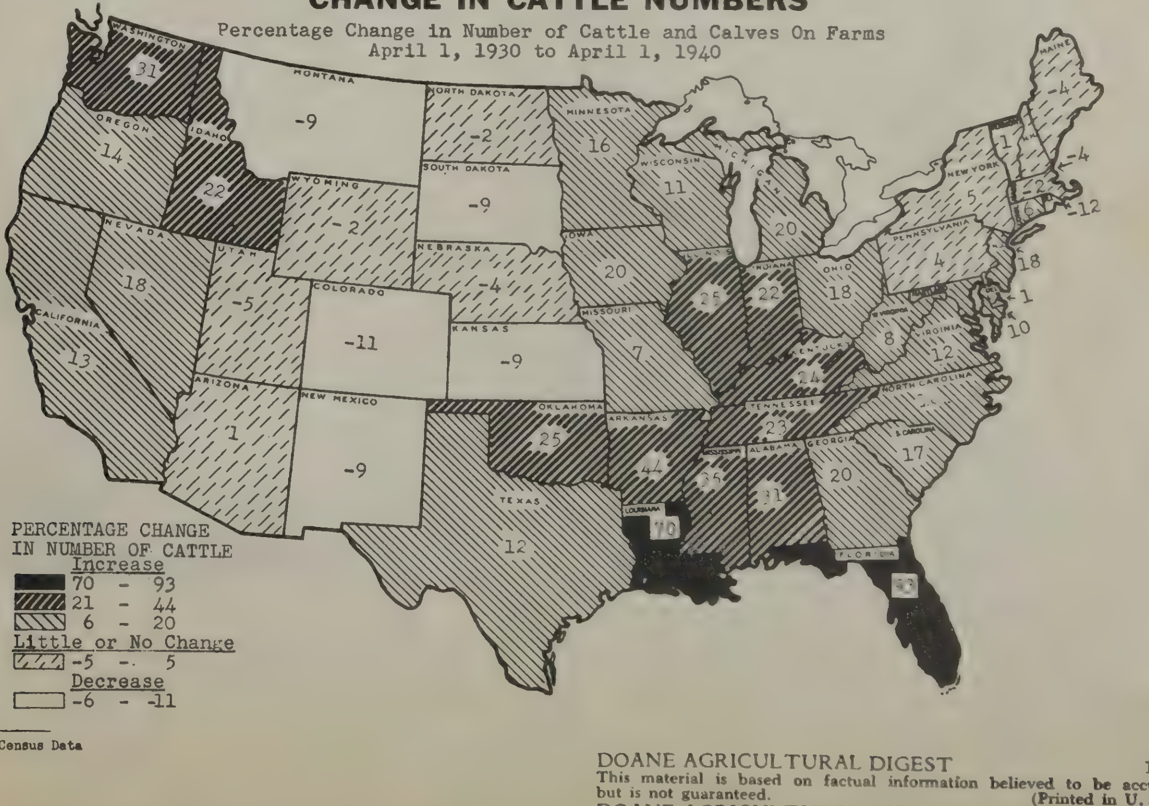


Cattle are of increasing importance as indicated by the 11.7 per cent increase in cattle numbers since 1930. This increase reflects an attempt on the part of the farmers to adjust their operations to changing economic and land-use conditions. In 1940, Texas, the leading cattle state, reported 10.4 per cent of the total U.S. number.

Although cattle numbers for the country as a whole have been increasing there have been certain very decided regional changes. Nine states in the drought belt and four states in the New England division show a net loss in cattle numbers in the past decade. In some parts of certain western states the declines in cattle population have partly resulted from the substitution of sheep. The southern states are definitely up in cattle numbers. Florida with a 93 per cent increase and Louisiana with a 70 per cent increase lead all others.

CHANGE IN CATTLE NUMBERS

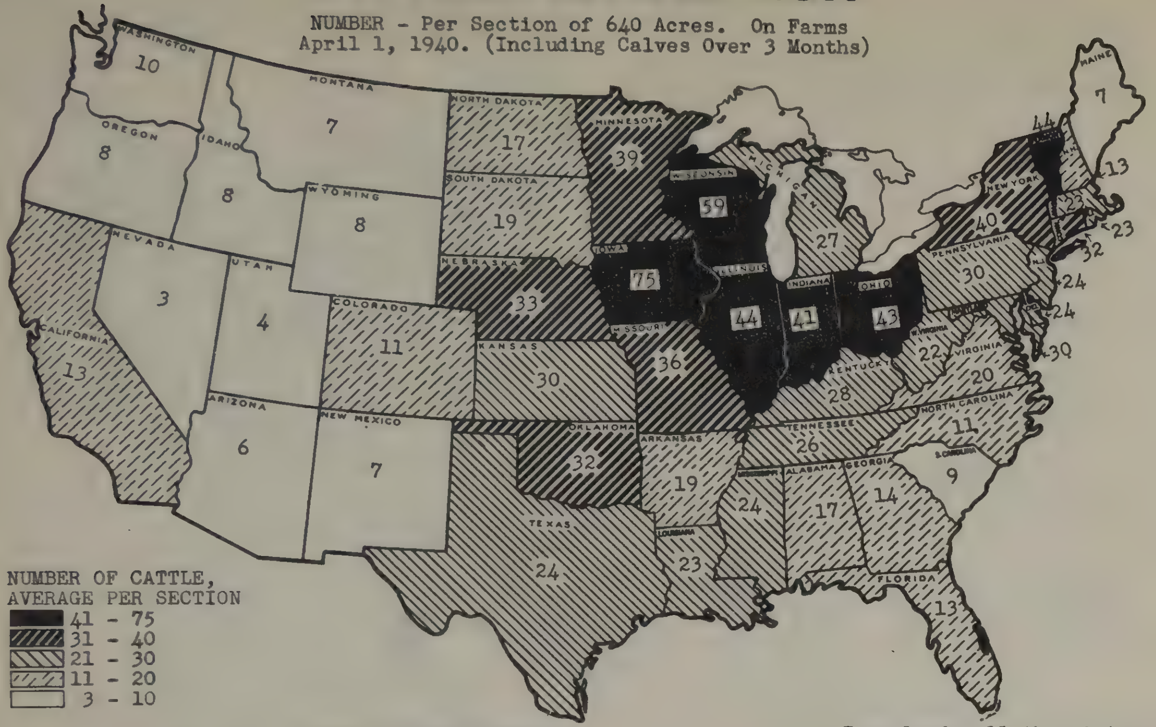
Percentage Change in Number of Cattle and Calves On Farms
April 1, 1930 to April 1, 1940



Based on Census Data

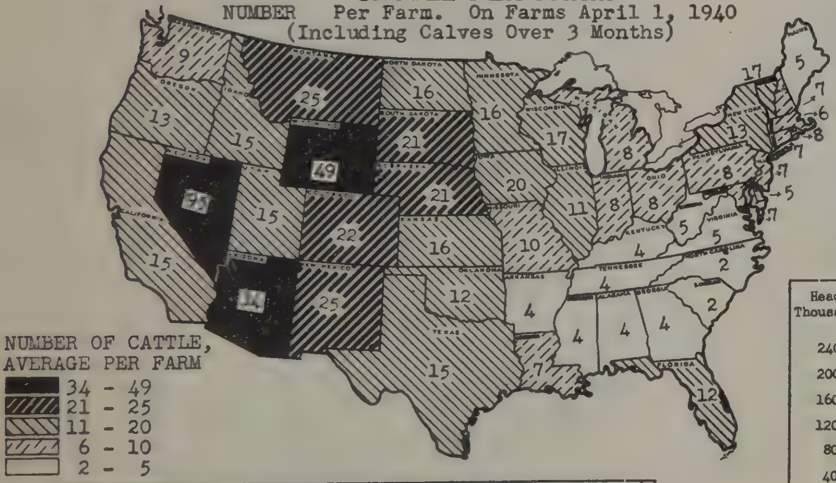
CATTLE PER SECTION

NUMBER - Per Section of 640 Acres. On Farms
April 1, 1940. (Including Calves Over 3 Months)



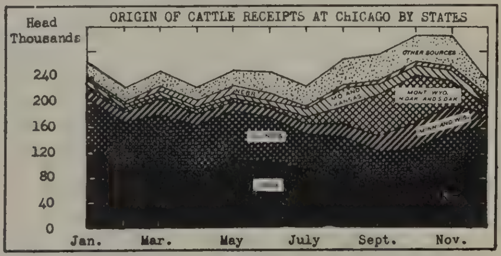
CATTLE PER FARM

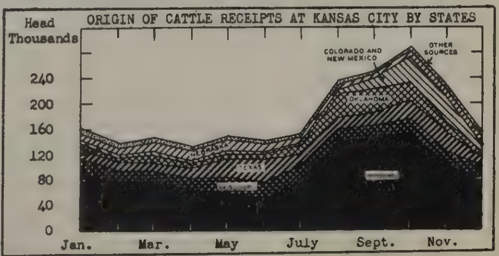
NUMBER Per Farm. On Farms April 1, 1940
(Including Calves Over 3 Months)

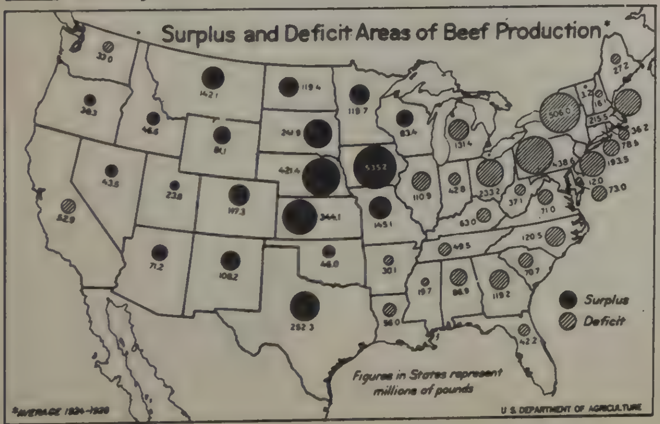


Iowa leads all the states in intensity of production in relation to land areas. Note the contrast in number of cattle per section for the crop producing states, particularly the Corn Belt as compared with the range and grazing areas.

Land in the range and grazing area, however, is held in much larger blocks and the number of cattle per farm or ranch unit is much larger in these areas. Nevada leads all states with an average of almost 95 head of cattle per ranch.


ORIGIN OF CATTLE RECEIPTS AT CHICAGO BY STATES


ORIGIN OF CATTLE RECEIPTS AT KANSAS CITY BY STATES


Surplus and Deficit Areas of Beef Production*

Figures in States represent millions of pounds

*AVERAGE 1934-1938

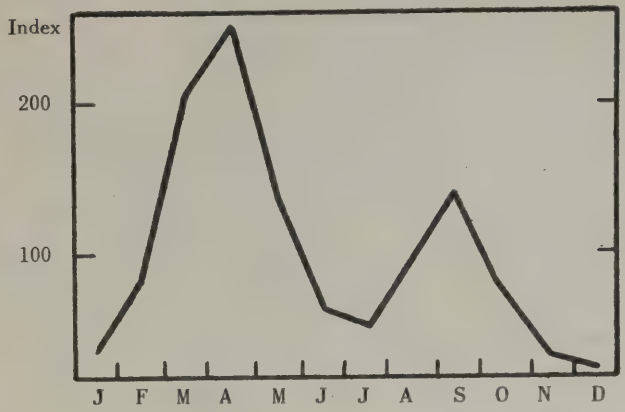
U. S. DEPARTMENT OF AGRICULTURE

The small graphs show the sources from which two major markets receive cattle at various times of the year, thus indicating the seasonal marketing. Both graphs show the heavy fall movement from grazing areas.

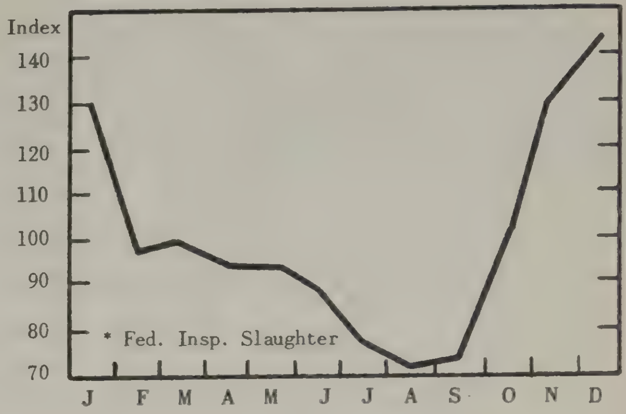
Based on Census Data

WHEN TO SELL HOGS

WHEN HOGS ARE FARROWED
U.S. Farrowings, By Months, 1945-1952 Avg.



WHEN HOGS ARE MARKETED
Slaughter*, By Months, 1945-1952 Avg.



SEASONAL-MOVEMENT OF HOG PRICES

Some sows farrow every month of the year but the bulk are farrowed during late spring and in early fall. From 6 to 10 months after peak farrowings the market receipts are highest.

Hog prices almost always rise from December to January and usually rise from January to February, May to June, and June to July. In 24 out of 25 years they have declined from October to November. Declines are typical also from September to October, and March to April. No seasonal average will describe the exact price movement during any one given year. The real problem is to determine the factors which cause differences from year to year.

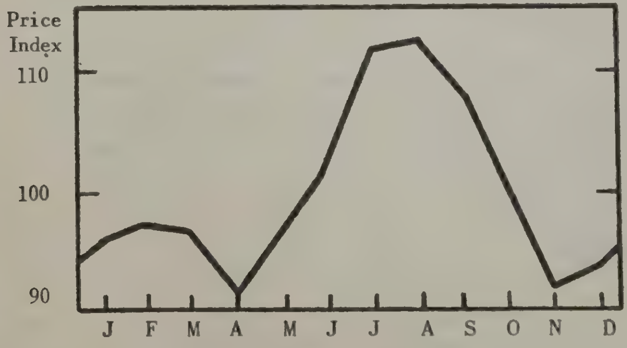
Changes In Demand can upset seasonal price movement. Sudden increases in demand cause prices to rise sharply. Lower demand may cancel out an expected rise.

Position Of Hog Cycle. (See page 205) Hogs have a definite cycle. But it is more irregular and shorter than the cattle cycle. During years when hog production is increasing the March high is typically above the summer high. During years when hog production is going down the peak in August-September is much higher than the spring high.

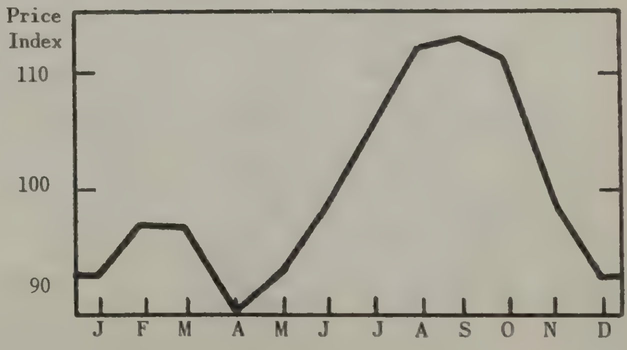
Corn Supplies And Prices have an important bearing on seasonal hog price trends. A large crop of soft corn causes farmers to rush the feeding period. A large crop of good corn encourages feeding to heavy weights because feed is low cost. When the hog-corn ratio at breeding time is above average expect a larger pig crop than in the previous year. (See page 229).

Storage Stocks. Only one-fourth to one-third of all pork is sold as fresh meat. The rest goes into cured pork and lard. Packers usually begin to fill cold storage with pork in the fall. If they expect good storage profits they bid prices up and the seasonal drop is less than usual. If the packers are uncertain they buy less for storage and prices are depressed.

WHEN TO SELL FAT HOGS
200-220 lb. Barrows & Gilts, Chicago, 1946-52



WHEN TO SELL SOWS
All Sows At Chicago, 1946-52



Graphs calculated from USDA data.

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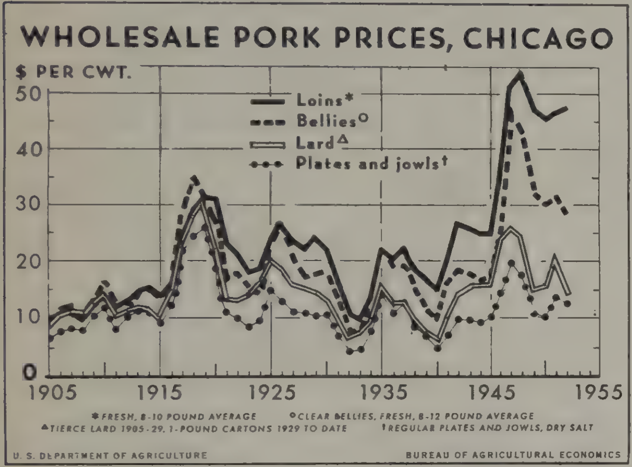
WHEN TO SELL HOGS

WHAT TO MARKET

Consumers have shown a growing preference for the lean cuts of pork over the past 50 years. As the prices of fat cuts and lard decline, more of the total dollar value must come from the lean cuts. Fat cuts are worth only 30 percent as much as lean cuts and lard is worth only 15 to 20 percent as much. Fifty years ago the fat cuts and lard were worth just as much as the lean parts.


WHOLESALE PORK PRICES, CHICAGO

*FRESH, 8-10 POUND AVERAGE °CLEAR BELLIES, FRESH, 8-12 POUND AVERAGE
△TIERCE LARD 1905-29, 1-POUND CARTONS 1929 TO DATE †REGULAR PLATES AND JOWLS, DRY SALT

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

Hog producers have been slow to change their methods of raising hogs. Farmers have gotten away from the very chuffy fat hog but marketing at heavy weights means more lard than necessary.

Producing more lean and less fatty hogs can be done. Good growth rate is not limited to over-fat hogs. The common opinion that long-bodied and lean pigs are poor in feeding quality has been disproved by L. N. Hazel, swine specialist at Iowa State College.

The percent of lean cuts increases with body length, but there is no noticeable trend in either growth rate or economy of gain.

LEAN CUTS, FEED ECONOMY, AND GROWTH RATE AS RELATED TO LENGTH OF BODY

Length of body (inches)	Lean cuts (per cent of live weight)	Feed per 100 lbs. gain	Weight at 5 months of age
28.5-29.4	37.0	339	225
29.5-29.9	37.6	349	222
30.0-30.4	37.5	336	227
30.5-30.9	38.1	337	222
31.0 and over	38.4	338	242

IOWA STATE COLLEGE

Carcass Grading is a method of buying which pays a premium to farmers who produce the type of hogs consumers want. This system of grading is now being used by a scattered number of packers. Farmers are paid more nearly the true market value of their hogs than under the present system.

Hogs vary in value because of the difference in:

- dressing percentage.
- weight of wholesale cuts.
- proportion of high value cuts and low value lard.

The present method of buying hogs puts most of the emphasis on live weight. Carcass grading would stress the factors which really influence the value of the hog carcass.

Returns to producers would be distributed differently if carcass grading was in wide usage. Farmers who marketed superior products would receive higher returns. Those who continued to sell inferior animals would receive less than under the present system.

WHAT WEIGHT TO SELL

The greatest demand at the butcher shop is for pork from a 200-225 pound hog. If the weight of hogs goes above 225 pounds, there is a great increase in the amount of fat produced. When large supplies of grain are available a farmer is often justified in feeding to heavier weights.

To decide what weight to feed to, the hog producer must know:

- The present level of hog prices and discounts for under or overweight animals.
- The seasonal pattern of hog prices, including the difference in seasonal pattern among various weights.
- The cost of producing additional grain.

Feed represents about 80 percent of the total cost of producing hogs. As hogs are fed to heavier market weights, feed costs become an even higher proportion of the total. The table shows the amount of feed required to add weight to hogs.

Additional feed consumption by full-fed hogs on alfalfa pasture and in dry lot, and days required to gain 25 pounds, by weight classes*

Change in marketing weight (pounds)	On alfalfa pasture: Feed consumed per hog: Corn	On alfalfa pasture: Feed consumed per hog: Supplement C	On alfalfa pasture: Days to gain 25 pounds	In dry lot: Feed consumed per hog: Corn	In dry lot: Feed consumed per hog: Supplement 5	In dry lot: Days to gain 25 pounds
	Bushels	Pounds	Number	Bushels	Pounds	Number
150 to 175	1.64	9.0	14	1.75	10.0	14
175 to 200	1.74	8.7	14	1.88	9.6	14
200 to 225	1.81	7.9	14	2.00	8.8	14
225 to 250	1.92	6.8	14	2.12	8.5	14
250 to 275	2.06	6.2	14	2.24	8.1	14
275 to 300	2.21	5.7	14	2.37	7.9	14

*Source: Original data that were summarized in Purdue Agr. Expt. Sta. Bul. 508, adjusted to fit farm conditions.

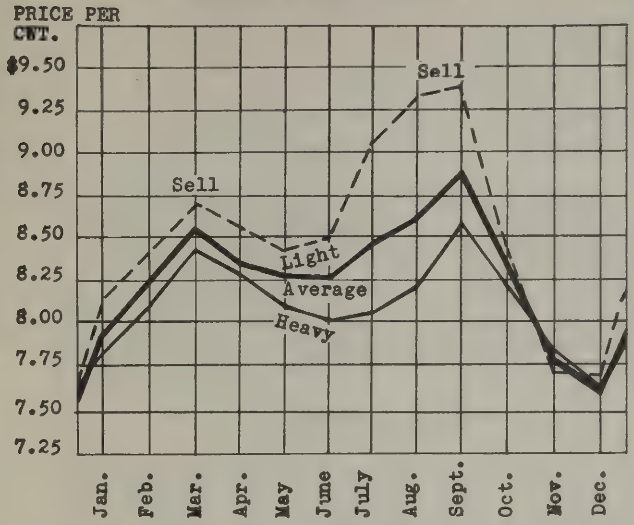
Calculation of costs and returns from holding a 175 pound hog in Dry Lot to successively heavier weights

Date	Marketing Weight	Price Per Cwt.	Value of Hog	Increase in Value of Hog	Additional cost of feed	Additional Net returns Over Feed Costs
	Pounds	Dollars	Dollars	Dollars	Dollars	Dollars
February 15	175	18.88	33.04	—	—	—
February 28	200	18.37	36.74	3.70	3.40	0.30
March 15	225	17.96	40.41	3.67	3.53	0.14
March 31	250	16.91	42.27	1.86	3.69	–1.81
April 15	275	15.83	43.54	1.27	3.88	–1.41
April 30	300	15.65	46.95	3.41	4.02	–0.61

The above table shows a calculation of costs and returns for the spring period. Note that the price received per cwt. declined the longer the hog was kept. In this case the farmer made the most money by feeding to an average of only 225 pounds.

WHEN TO SELL HOGS

WHEN TO SELL FAT HOGS
(BARROWS AND GILTS)



Price of Good Choice Barrows
and Gilts - Chicago. 18-Year Average
1923 - 1940 Inclusive

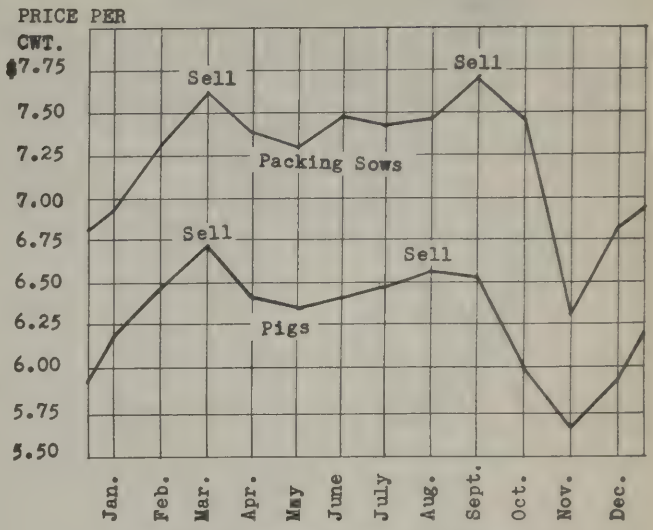
Hog prices vary by season with a high degree of regularity owing to the variation in market receipts from month to month. These changes occur with such certainty that hog producers can materially increase their income by marketing in the month when prices are normally the highest. Hogs sold in September are worth $3.50 more per head than hogs sold in December. This amounts to $750.00 on a 20-sow herd on a two-litter system--enough to make the difference between success or failure with the hog enterprise.

In order to take advantage of these higher price periods, at least two things can usually be done to advantage:

1. Regulate the farrowing dates of the sows, and
2. Use forced or delayed feeding so as to bring hogs to market weight during the high-price periods. (See Page 225)

Even though these normal seasonal cycles may be disturbed by the longer cycles of hog production and prices, producers will usually profit most by a more even production from year to year giving consideration to feed costs and supplies.

WHEN TO SELL SOWS AND PIGS



Price of Packing Sows - St. Louis
15-Year Average 1924 - 1939 Inclusive
Price of Pigs - Chicago
12-Year Average 1929 - 1940 Inclusive

Avoid selling sows and pigs during the months of November, December, and January. March is normally the high-priced month of the year and with a good hog program, sows can and should be fed to heavier weights to reach this market. Producers using the D.A.S. Two-litter Hog System should cull most heavily in the spring. Finish the herd as rapidly as possible, so they will go to market during the summer. The small difference in price per cwt. obtainable throughout the summer period will not justify special feeding practices designed to sell the sows at the September peak.

Two systems of feeder-pig production are recommended for operations where corn or other feed shortages are a limiting factor. Where winters are not too severe, the D.A.S. Two-litter Hog System can be adapted to feeder-pig production simply by shifting the breeding and farrowing dates to May and November. These pigs will sell at highest prices in March and September. Where winter production is not practical, feeder pigs can be successfully produced on a one-litter system with sows farrowing in May.

SEASONAL MOVEMENTS OF HOG PRICES

"There is typically a rise of prices from December to March. This rise is followed by a smaller decline as the fall pig crop comes to market in the spring months. Prices then rise again in July and August and reach a peak in September which is somewhat higher than is the peak in March.

"In no individual year. . . .are prices likely to follow exactly the average seasonal pattern. Irregularities of marketing and of demand conditions combine to give a unique course of prices each year. Nevertheless, these irregularities can often be anticipated to some degree. In years of a low corn-hog ratio (high corn prices relative to hog prices) marketings are likely to be earlier than usual so that the seasonal low price is also earlier. Similiarly, in years of a high corn-hog ratio, marketings are often late and result in late seasonal low points and price peaks.

"Another significant difference between years is that, compared with the average seasonal movement, there is sometimes an upward trend of prices during the season. In other years there is a downward trend...For years in which the seasonal trend is upward. . . .the late summer or fall peak of prices is likely to be much higher than the spring peak."

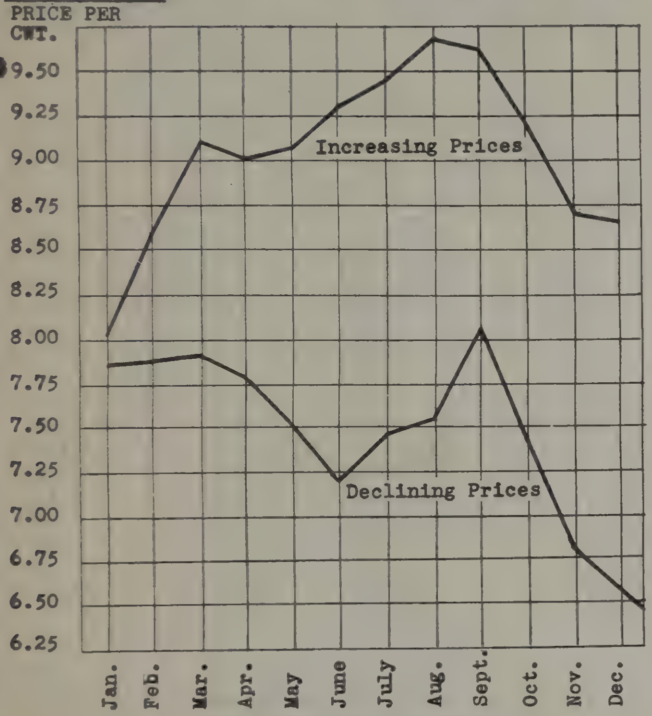
University of Illinois

WHEN TO SELL HOGS

FACTORS THAT MODIFY NORMAL SEASONAL PRICE TRENDS

POSITION IN THE HOG CYCLE

The price of hogs tends to run in cycles with two to three years of falling prices and two to three years of rising prices. The marketing cycle is just the reverse. In years when hog prices are declining, the fall peak in prices averages just about as high as the spring peak and there is a tendency for the fall peak to come slightly later than normal. In years when hog prices are going up, there is almost a continuous rise from January to August, and the price break from September to December is not nearly as great as in years when prices are declining.



Good and Choice Barrows
and Gilts - Chicago. 9 Years
of Declining Prices and 9 Years
of Increasing Prices
1923 - 1940 Inclusive

These differences are largely the result of the seasonal pattern of slaughter. Lower prices are normally the result of heavier marketing. These market receipts come chiefly from increased spring and early summer farrowings which reach the market in November, December, or January. When hog prices are declining, many gilts and sows which would otherwise be saved for breeding, are fattened for the market, and added to the congestion. In years of declining prices, it is very important that all hogs possible be sold during the fall peak, and that the hogs not be held back and fed to heavier weights which will force them onto a lower market.

When hog prices are rising, gilts and sows are held back for breeding purposes and farmers tend to feed their market hogs to slightly heavier weights. This delays the normal movement of receipt and results in somewhat less than normal seasonal movements of prices.

SIZE OF THE CORN CROP

When there is a small corn crop hog producers market their spring pigs earlier than usual and at lighter weights than normal. This is because the price of corn goes up. Fewer gilts and sows are held back for breeding, and the November and December price decline tends to be accentuated. This is followed by rising prices beginning in January.

A large corn crop, on the other hand, resulting in lower prices of corn, tends to slow up the marketing of hogs from August to January. Gilts and sows are held back for breeding purposes and hogs are fed to heavier weight to take advantage of the cheap new corn. The result is that the low prices of December continue into January and February as contrasted to years of short corn crop when the price trend is distinctly up after the first of the year.

HOG-CORN PRICE RATIO

This term is used to express the relationship between corn prices and hog prices. The hog-corn price ratio is said to be favorable when the price of corn is low relative to the price of hogs. It is unfavorable when the price of corn is high in relation to hog prices.

Hog-price curves in years of favorable hog-corn ratios (low corn prices) are similar to those following large corn crops. When the ratio is unfavorable (high corn prices) hog price curves are similar to those in years of small corn crops.

STORAGE STOCKS

Storage stocks do not have a long-time effect on the farm price of hogs. However, seasonal price changes are greater in years when storage stocks are low than in years when they are average or large.

SEASONAL TREND OF HOG AND CORN PRICES

The prices of both hogs and corn decline rapidly after September with the result that in most years it is more profitable to full feed the early spring pigs and market them by September, than to feed a light ration during the summer and finish on cheap new corn. The decline in the price of corn is seldom sufficient to offset the lower value of the hogs held back for the later market.

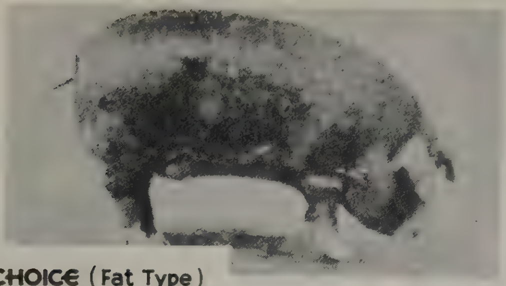
WEATHER

A mild open spring means a larger number of pigs are saved per litter. As a result, marketings are somewhat heavier, pigs make more rapid gains, and seasonal price declines tend to be slightly earlier than usual.

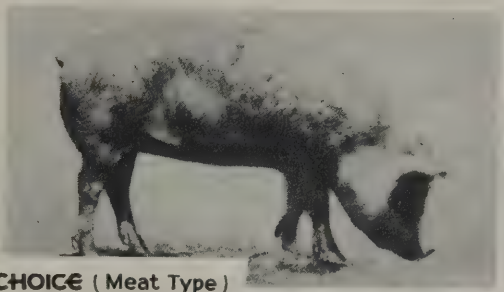
A cold backward spring causes heavy pig losses and slow gains. As a result, the hogs reach market later, total receipts fall slightly, and fall price declines come later than usual.

MARKET CLASSES AND GRADES OF SWINE

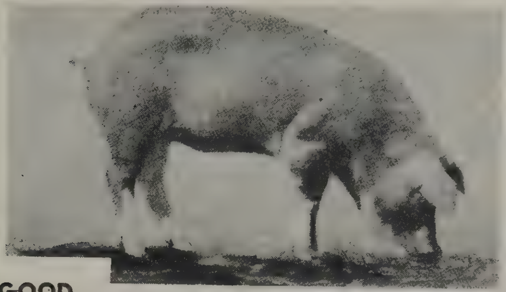
MARKET HOGS



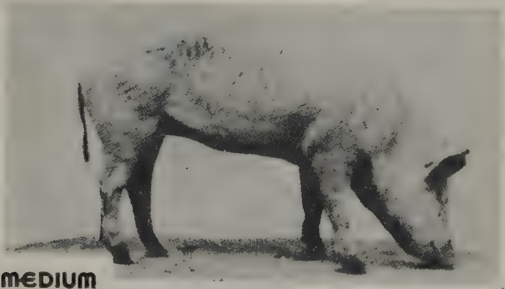
CHOICE (Fat Type)



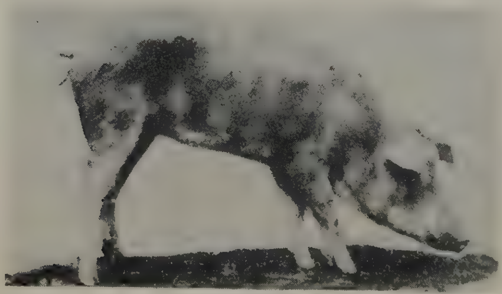
CHOICE (Meat Type)



GOOD



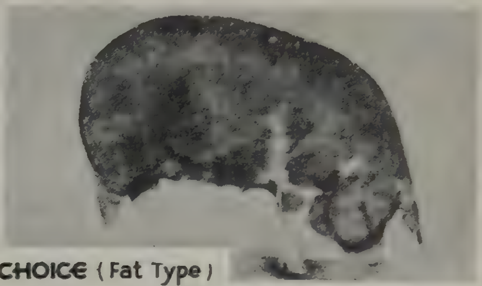
MEDIUM



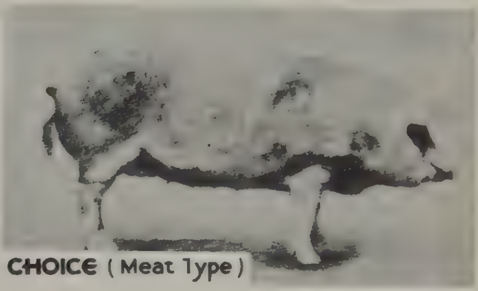
CIRCULAR 569, U. S. DEPT. OF AGRICULTURE

(Revision of Page 216.5)

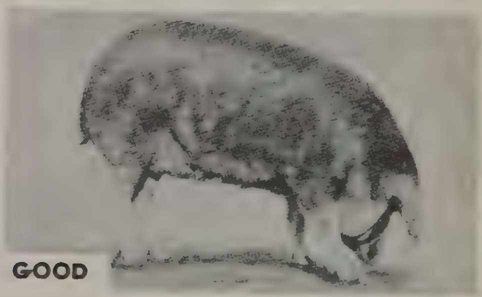
SOWS



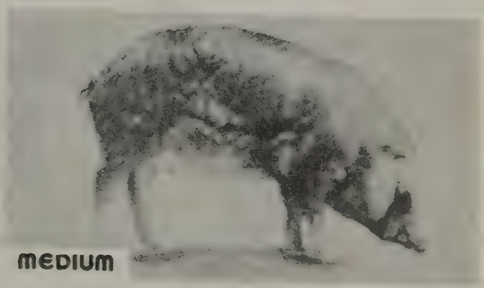
CHOICE (Fat Type)



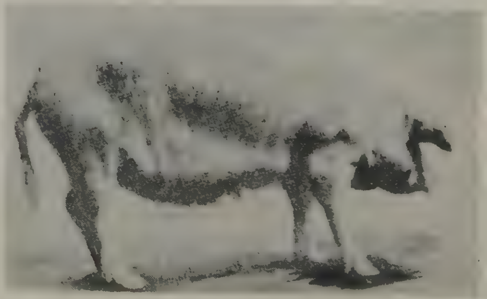
CHOICE (Meat Type)



GOOD



MEDIUM



MARKET CLASSES AND GRADES OF SWINE

Slaughter Swine.—Slaughter Swine are hogs and pigs that are intended for immediate slaughter or are more suitable for slaughter than for any other purpose.

Feeder and Stocker Swine.—Feeder and Stocker Swine include all hogs and pigs that show ability to take on additional weight and finish and are traded in for Feeder and Stocker use. Although they may be more suitable for further growth and fattening than for slaughter purposes, if they are to be slaughtered in their existing condition, they are automatically classified as Slaughter Swine and graded accordingly.

AGES AND WEIGHTS

Two general age groups are used in classifying swine. They are Pigs and Hogs. Actual ages are not observed but the selection is made largely by weight in relation to the apparent age of the animal. Young animals weighing under 120 pounds are called Pigs and those weighing over 120 pounds are called Hogs.

Market prices for Pigs and Hogs, as for other market animals, usually vary materially according to the weights of the animals.

The weight of a Slaughter Hog, together with its grade, has an important influence on its yield in carcass and on the kinds and yields of the commercial cuts that can be made from its carcass and therefore on the market values of the carcass and cuts. The weights, yields, and values of the cuts change with relatively small changes in the weights of the hogs. Consequently in general market practice, hogs, as a rule, are grouped according to relatively narrow weight ranges. Boars and Stags usually are not so grouped. The weight groups most generally used are shown in the Slaughter Hog schedule.

SLAUGHTER HOGS

The market classes for hogs weighing over 120 pounds are: Barrows, Gilts, Sows, Boars, and Stags. The market classes for pigs weighing from 60 to 120 pounds are Barrows, Gilts, and Boars. Pigs under 60 pounds are not separated by classes because the sex of the young animal under this weight usually has not developed sufficiently to exert an influence on its grade or value.

A **Barrow** is a castrated male swine that shows no pronounced indication of sex development similar to that of a Boar. As a class, Barrows are more evenly developed and balanced in conformation than are Sows, Stags, or Boars. The difference between Barrows and Gilts in these respects, however, is very slight.

A **Gilt** is a female swine that has not produced pigs and that has not reached an evident stage of pregnancy.

A **Sow** is a female swine that shows evidence of having produced pigs or that is in an evident stage of pregnancy.

A **Boar** is an uncastrated male swine.

A **Stag** is a castrated male swine that shows pronounced sex development or physical characteristics peculiar to the adult Boar.

Significance of "Type" in the Slaughter Hog Classification.—The term "type" is used only with the Choice grade and in combination with the words "Fat" or "Meat" as "Choice (Fat type)" or "Choice (Meat type)," These terms "Choice (Fat type)" and "Choice (Meat type)" are used to designate and differentiate between two grades of finished Slaughter Hogs, both of which are Choice or No. 1, but the carcasses and cuts from each type are different in many respects. The carcasses have different proportions of fat to lean and produce different quantities or percentages of primal wholesale cuts of pork. The Choice (Meat-type) hog is relatively long and narrow and has a lower proportion of fat to lean than the Fat-type hog. The Choice (Fat-type) hog is wider in proportion to its length and depth and has heavier or thicker deposits of fat than the Choice (Meat-type) grade hog of the same weight.

SCHEDULE: MARKET CLASSIFICATION FOR SLAUGHTER HOGS

Class	Weight group	Grade
Barrows and gilts.	120–140 pounds	Choice (Fat type). Choice (Meat type). Good. Medium. Cull.
	140–160 pounds	
	160–180 pounds	
	180–200 pounds	
	200–220 pounds	
	220–240 pounds	
	240–270 pounds	
	270–300 pounds	
	300–330 pounds	
	330–360 pounds	
	360–400 pounds	
	400 pounds up	
Sows	270–300 pounds	Choice (Fat type). Choice (Meat type). Good. Medium. Cull.
	300–330 pounds	
	330–360 pounds	
	360–400 pounds	
	400–450 pounds	
	450–500 pounds	
	500–600 pounds	
	600 pounds up	
Stags	All weights	Ungraded.
Boars	All weights.	Ungraded.

SLAUGHTER PIGS

Slaughter Pigs, as the term implies, are young swine weighing under 120 pounds that are intended for immediate slaughter.

No class distinctions are made for Slaughter Pigs, including uncastrated males, that weigh under 60 pounds. Pigs, excluding uncastrated males, that weigh from 60 to 120 pounds are classified as Barrows and Gilts and sold together. Boar pigs that weigh more than 60 pounds rarely are sold for slaughter but when so marketed they are sold as Boars.

Slaughter Pigs that weigh under 60 pounds, as a rule, are not graded because they have not reached sufficient maturity for variations in their conformation, finish, and quality to cause material variations in their relative market values. Three grades usually are applied to Slaughter Pigs that weigh between 60 and 100 pounds. They are: Good, Medium, and Cull. Pigs of these weights rarely reach the degree of conformation, finish, and quality required in order to be graded Choice. Those that weigh from 100 to 120 pounds have four grades. They are: Choice, Good, Medium, and Cull.

SCHEDULE: MARKET CLASSIFICATION FOR SLAUGHTER PIGS

Class	Weight group	Grade
All classes	Under 30 pounds	Ungraded
	30–60 pounds	
Barrows and Gilts	60–80 pounds	Good Medium Cull
	80–100 pounds	
	100–120 pounds	Choice Good Medium Cull

FEEDER AND STOCKER SWINE

Feeder and Stocker Swine are those hogs and pigs that are intended for further development by growth and fattening. As a general rule they lack sufficient thickness and firmness of finish or fat to qualify for the better grades of slaughter animals. When such animals are used for immediate slaughter, however, they automatically are classified as Slaughter Hogs and Pigs and are graded according to the standards for slaughter animals. Normally Feeder and Stocker Pigs constitute a relatively small proportion of the total number of swine marketed annually.

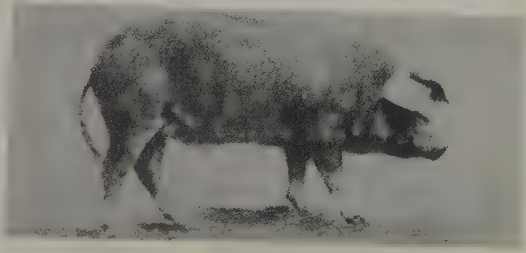
There are five possible classes for Feeder and Stocker Hogs. They are: Barrows, Gilts, Sows, Boars, and Stags, and three possible classes for Feeder and Stocker Pigs. They are: Barrows, Gilts, and Boars. Barrows and Gilts are the only classes of Feeder and Stocker Swine that appear on the market in considerable numbers. Feeder and Stocker Barrows and Gilts are generally grouped together when offered for sale on the market.

The usual market weight groups for Feeder and Stocker Hogs and Pigs are relatively narrow.

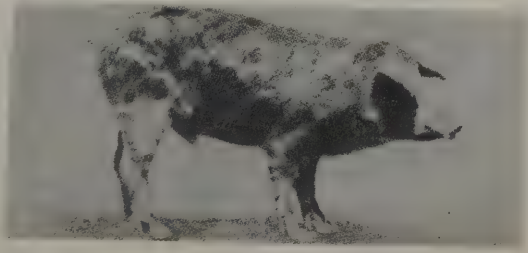
The grades for Feeder and Stocker Hogs and Pigs are: Choice, Good, Medium, and Common.

FEEDER AND STOCKER SWINE SCHEDULE

Class	Weight selections		Grade
Barrows and Gilts	Hogs	120–140 pounds	Choice. Good. Medium. Common.
		140–160 pounds	
		160–180 pounds	
	Pigs	80 pounds down	
		80–100 pounds	
		100–120 pounds	



Good grade Feeder and Stocker Pig.

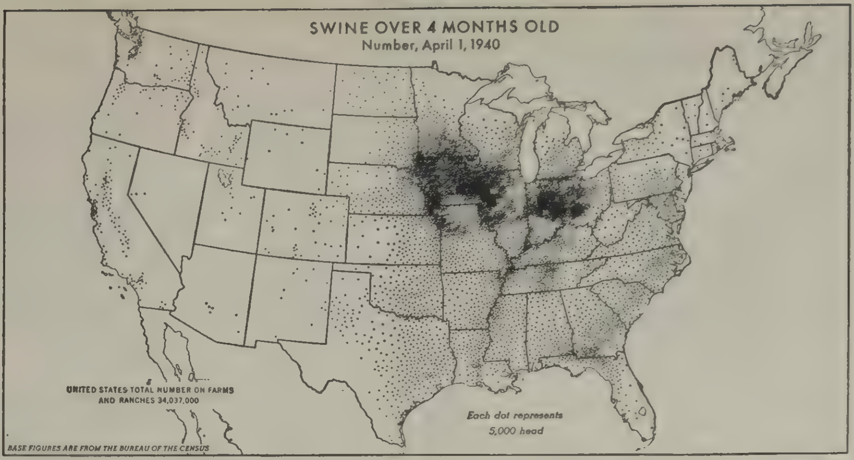


Common grade Feeder and Stocker Pig.

U. S. DEPT. OF AGRICULTURE, DEPARTMENT BULLETIN 1360, CIRCULAR 569. AMA

HOG FACTS

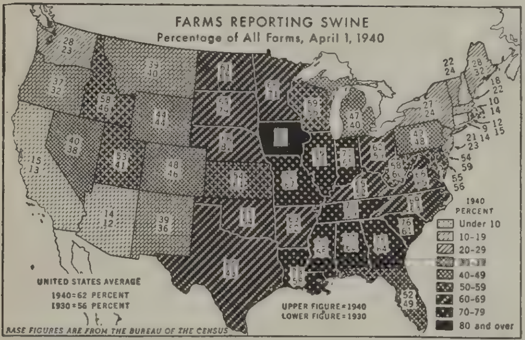
HOG NUMBERS


SWINE OVER 4 MONTHS OLD
Number, April 1, 1940
UNITED STATES TOTAL NUMBER ON FARMS AND RANCHES 34,037,000
Each dot represents 5,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42165

Distribution of swine in the United States follows closely the pattern of the distribution of corn, as corn is the principal feed for hogs. In the States partly or wholly included in the warm fertile Corn Belt, where corn is abundant and where alfalfa grows well, are concentrated about 60 percent of all hogs. There are at least six times as many swine per square mile in the Corn Belt proper as in the Cotton Belt. In 1940, about 4,902,000 swine over 4 months old, or nearly 25 percent of the hogs in the Corn Belt, were in Iowa; Illinois was second, with 2,951,000; Indiana third, with 2,383,000; and Missouri fourth, with 2,347,000. It is estimated that on January 1, 1943, there were nearly 20 percent more hogs on farms than on January 1, 1940.

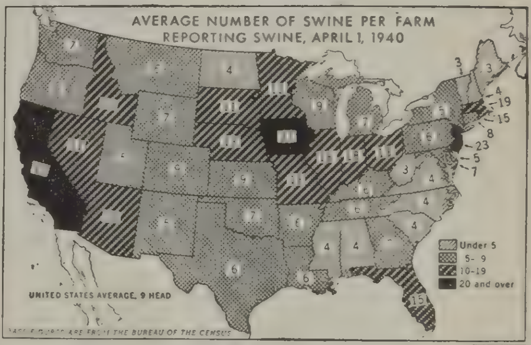
FARM REPORTING HOGS



BAE 42797

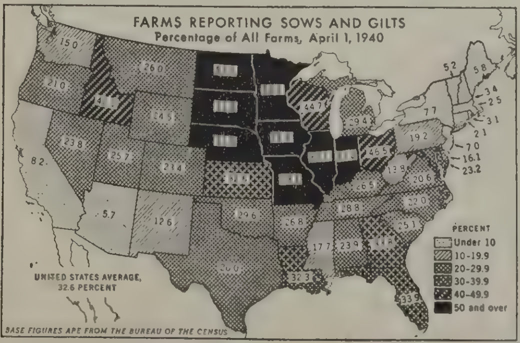
The proportion of farmers who raise hogs increased between 1930 and 1940 in the eastern Corn Belt States of Ohio, Indiana, Illinois, and Missouri, and in Wisconsin, and decreased in the western Corn Belt States of South Dakota, Nebraska, and Kansas. The western Corn Belt States are subject to droughts which cut down feed supplies, and the number of farmers who raise hogs has been declining for 20 years. Large percentage increases in farmers raising hogs between 1930 and 1940 occurred in every State in the Cotton Belt where hog numbers have been steadily higher.

NUMBER OF HOGS PER FARM


AVERAGE NUMBER OF SWINE PER FARM
REPORTING SWINE, APRIL 1, 1940
Under 5
5- 9
10-19
20 and over
UNITED STATES AVERAGE, 9 HEAD
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

The average number of swine per farm reporting, on April 1, 1940, was the same as on January 1, 1935; whereas on January 1, 1925, the United States average was 14 head. Most of this decrease doubtless occurred after 1933 and can probably be attributed to the drought and the Agricultural Adjustment programs. On January 1, 1925, California reported 21 head per farm and Iowa 47, whereas on April 1, 1940, both States reported 27 head per farm, although Iowa had 9 times as many farms reporting as California.

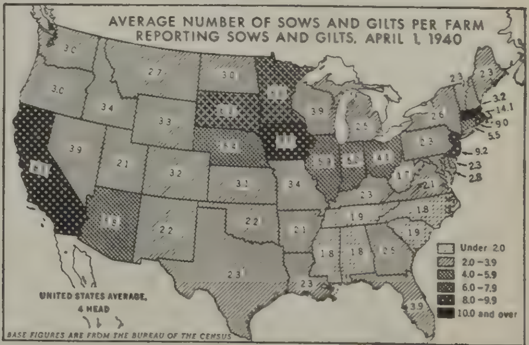
FARMS REPORTING SOWS AND GILTS


FARMS REPORTING SOWS AND GILTS
Percentage of All Farms, April 1, 1940
PERCENT
Under 10
10-19.9
20-29.9
30-39.9
40-49.9
50 and over
UNITED STATES AVERAGE, 32.6 PERCENT
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42796

On April 1, 1940, the percentage of all farms reporting sows and gilts was about 5.8 percent more than on April 1, 1930. South Dakota, North Dakota, Nebraska, Iowa, and Minnesota all show more than 50 percent of all farms as having sows and gilts. However, these States all had from 6 to 40 percent fewer sows and gilts per farm on April 1, 1940, than on April 1, 1930. Practically all the other State except Kansas had a larger percentage of farms reporting sows and gilts in 1940 than in 1930.

NUMBER OF SOWS AND GILTS PER FARM


AVERAGE NUMBER OF SOWS AND GILTS PER FARM
REPORTING SOWS AND GILTS, APRIL 1, 1940
Under 2.0
2.0-3.9
4.0-5.9
6.0-7.9
8.0-9.9
10.0 and over
UNITED STATES AVERAGE, 4 HEAD
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

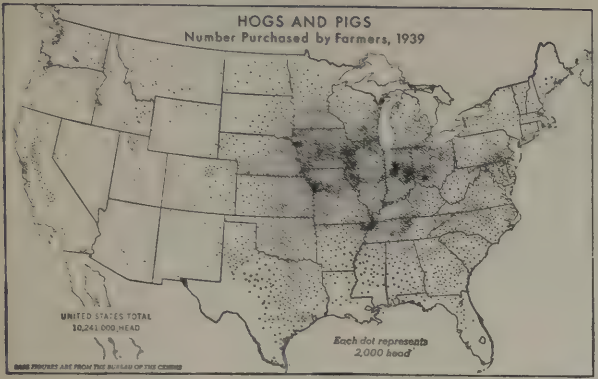
BAE 42795

The average number of sows and gilts per farm reporting on April 1, 1940, varies from about 4 to 10 in the heavy swine-producing areas of the Corn Belt. Hog numbers are relatively small in Massachusetts, Rhode Island, New Jersey, and California, where from 8 to 14 sows and gilts per farm were reported. Five eastern Cotton Belt States and West Virginia averaged less than 2 per farm.

224.2

HOG FACTS

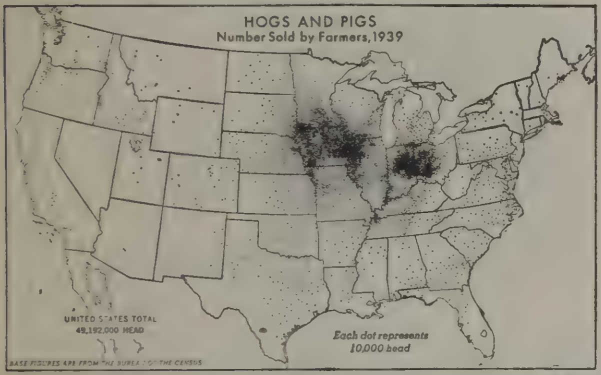
HOGS AND PIGS PURCHASED


HOGS AND PIGS
Number Purchased by Farmers, 1939
UNITED STATES TOTAL
10,241,000 HEAD
Each dot represents
2,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42935

In 1939 Iowa farmers bought more than a million head of hogs and pigs. Purchases were also heavy in Missouri, Illinois, Indiana, and Ohio, all of which are concentrated in the Corn Belt where commercial production of hogs is a well-established business. Large numbers of hogs and pigs were reported as bought by farmers in many other States where greater hog numbers were being built up.

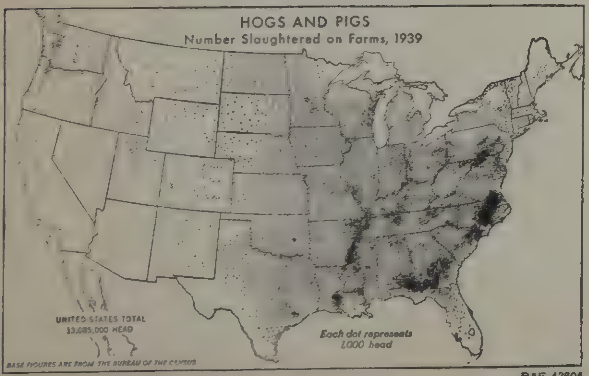
SOLD



BAE 39788

The commercial production of hogs is concentrated in the Corn Belt Fewer hogs were sold from eastern Illinois and western Indiana due to the sale of corn for grain from this area to the Chicago and Peoria markets. With the exception of this area, the sales of hogs follow closely the pattern of corn production throughout the country.

SLAUGHTERED


HOGS AND PIGS
Number Slaughtered on Farms, 1939
UNITED STATES TOTAL
13,085,000 HEAD
Each dot represents
1,000 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42804

In 1939 the number of hogs slaughtered on farms were mostly for home use and were only a little more than one-fourth as many as were sold in that year. Some hogs are slaughtered on farms in practically all parts of the United States. The areas of most extensive slaughter are in the South along the Coastal Plain; in the Southern Appalachians, southeastern Pennsylvania, and western Maryland, along the lower Mississippi Valley, and in many other areas of the East where general farming is common. Few hogs are slaughtered on farms in the New England and Western States.

THE HOG ENTERPRISE

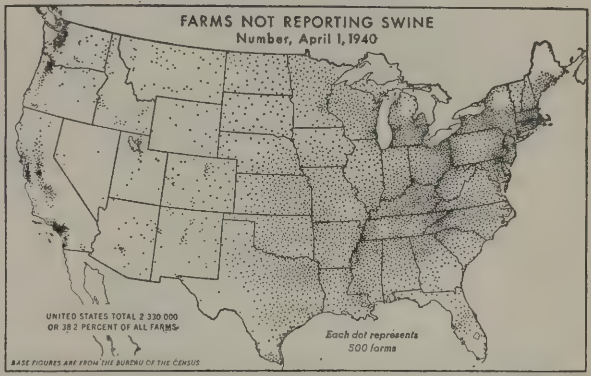
There are two distinct classes of swine in the United States, represented by breeds of the lard type and of the bacon type. Lard-type hogs are bred much more extensively by farmers throughout the United States than those of the bacon type. The principal lard-type breeds are Duroc-Jersey, Poland China, Chester White, Berkshire, Hampshire, and spotted Poland China. The only bacon-type hogs that are bred extensively are the Tamworth and the Yorkshire.

In 1870, the number of swine in this country was 33,781,000. The North Central States were recorded as having 16,933,000, and 16,848,000 were in all other States. By January 1, 1942, there were 41,389,000 out of a total of 60,377,000 in the North Central States. That is, the production of hogs in the Swine Belt more than doubled during the 62-year period January 1, 1870–January 1, 1942, whereas little increase has taken place in other States.

The average number of swine on farms January 1, for the period 1932–41 was 51,508,000. On January 1, 1942, 60,377,000 were reported and on January 1, 1943, it was estimated that there were 73,660.000 swine on farms, a record for all time.

Hogs contribute their share to farm income. Data furnished by the Bureau of Agricultural Economics indicate that an average value of hog production for the 10-year average, 1930–39, was $944,258,000; for 1941 it was about $1,575,520,000; and for 1942 it arose to as much as $2,733,212,000.

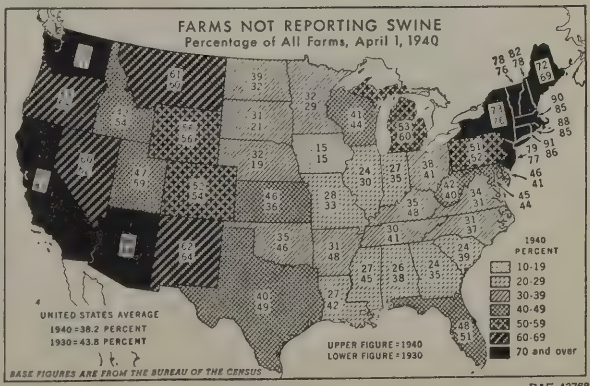
FARMS WITH NO HOGS


FARMS NOT REPORTING SWINE
Number, April 1, 1940
UNITED STATES TOTAL 2 330 000
OR 38.2 PERCENT OF ALL FARMS
Each dot represents
500 farms
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42955

Farms not having swine are most numerous in the Dairy Belt and New England. Large numbers of farmers without swine also reported from Kentucky, Tennessee, and the northern part of the Cotton Belt where most of the meat is shipped in. From California, Oregon, and Washington many farms were reported without swine on April 1, 1940. Even in the Corn Belt proper from 15 to 40 percent of the farmers have no hogs.

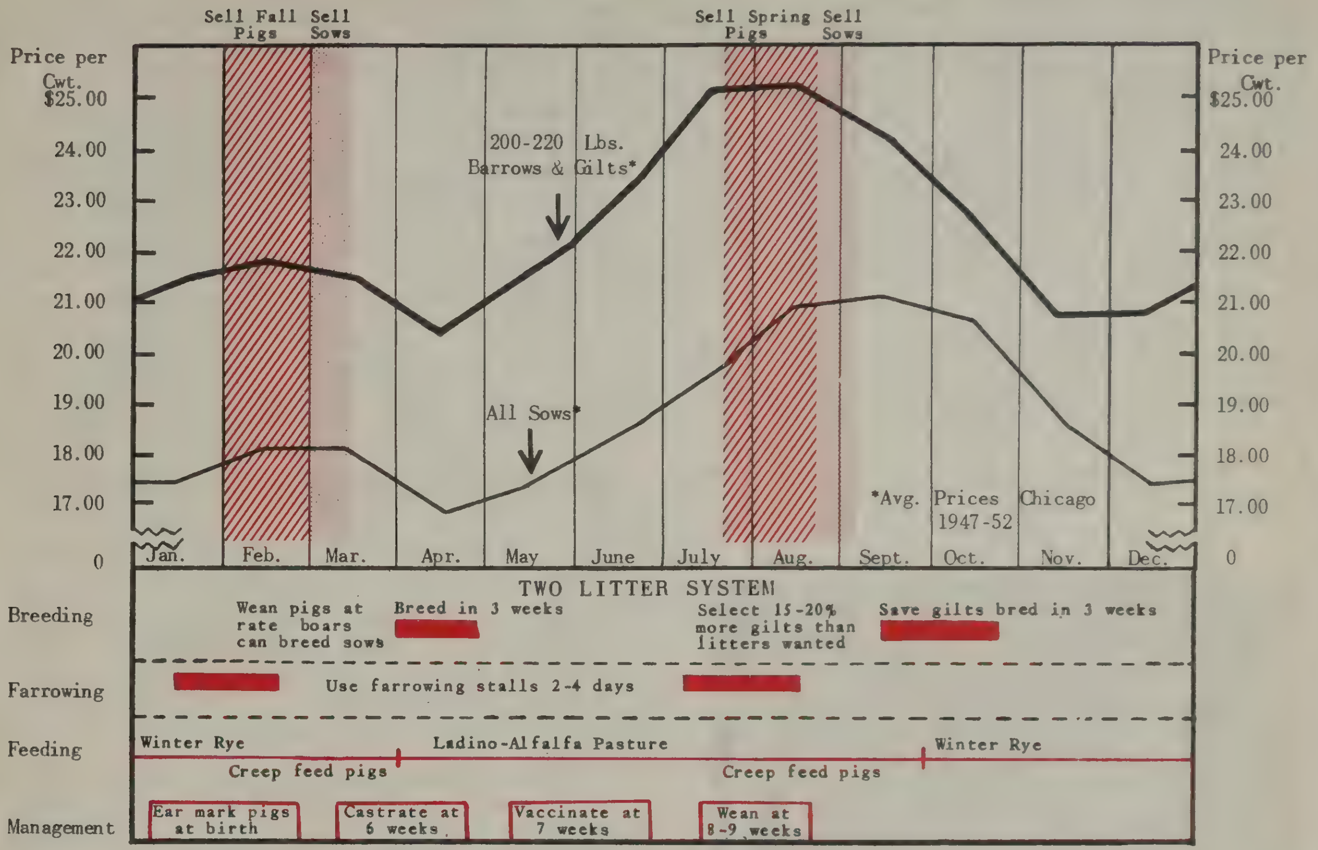
FARMS WITH NO HOGS



BAE 42768

Iowa, the greatest hog-producing State, had 15 percent of its farms not reporting swine on April 1, 1930, and April 1, 1940. The effect of the droughts of 1934 and 1936 is reflected in North Dakota, South Dakota, Nebraska, Kansas, and Minnesota where the percentages of farms not reporting swine increased considerably. The eastern Corn Belt, Southern, and several Western States had smaller percentages of farms not reporting swine on April 1, 1940, than on April 1, 1930.

DOANE HOG SYSTEMS



TWO LITTER SYSTEM

This system has proved practical where proper housing, equipment and good help are available. Breeding, farrowing, and selling must be done at the right time to be successful.

Sows or gilts must be bred from September 24 to October 15 so that all spring pigs are farrowed in a three week period during the last of January and early February.

Early farrowing is necessary to hit the high price periods of July and August. Peak market prices are about the only way to meet all costs of housing, electricity, labor and feed that are needed for successful hog production.

Gilts or sows producing fall litters must be bred from April 1 to May 1 so that all pigs are farrowed by September 1.

MODIFIED TWO LITTER SYSTEM

A modified program can be used in northern areas where winter facilities are not adequate or where much work is done by hired help. Those who use this plan should weigh the strong and weak points carefully.

Gilts are bred for fall litters from April 10 to May 1. Pigs are fed out on new corn and marketed during January and February. The sows are held over and bred for their second litter from January 1 to 20 so they will be farrowing from April 25 to May 15.

Two disadvantages result with this system. Two crops of pigs must be carried on the farm during the fall. The spring crop of pigs is sold when prices are usually low and the fall crop is sold when high prices are less certain.

ONE LITTER SYSTEM

A one-litter system has a place on farms where hogs are not the only major source of income. Farrowing should be completed on pasture within a 3-week period in June, July or August. Hogs are fed new corn and finished for market in January and February after the heavy fall marketing runs are usually past.

The one litter program will have these advantages: Farrowing in warmer weather; less labor in caring for baby pigs; lower pig losses at farrowing; pigs fed out on new corn; and lower costs for buildings and electricity.

Main disadvantage is lower volume. Housing and equipment are not used as fully. Prices during the first 3 months of the year are not as dependable as during July and August.

DOANE AGRICULTURAL DIGEST ® MAY, 1953
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POINTS FOR PROFIT

Sanitation remains the major part of any successful hog program. Keep pigs on clean ground by rotating pastures to a new field each year. No one has produced pork for any length of time without practicing sanitary measures.

Ladino Clover with alfalfa is the key to low feed costs and large carrying capacity. An established stand will carry 20 pigs and 3 sows or 30 weaned pigs per acre. Seed 1-2 pounds of ladino per acre and 5 to 7 pounds of alfalfa. Seeded with oats, it will be ready for full use the second year.

Use Large Portable Houses -- They can be moved to a different pasture each year. A 10 to 12 sow house costs less per litter and is warmer during cold weather.

Farrowing Stalls help save more pigs -- use until pigs are 2 to 4 days old. Keep each litter separate for 7 to 12 days -- then run several litters of same age together.

Select Boars from high producing, healthy herds. Have one boar for every 12 to 15 sows. If more than one boar is used, keep one out of service each day giving him rest. Let the boars run with all the sows. Blood test all sows for brucellosis before each breeding season.

LIMIT FARROWING to a 3-week period by saving only sows that settle in 3 weeks of the breeding season. Save out 15 to 20 percent more sows for breeding than you plan to farrow. Sell slow breeders to get them out of the way.

Feed Brood Sows a balanced, high-protein ration. Figure on ½ pound 40 percent protein mixture, 3½ to 4 pounds of corn, and ½ pound alfalfa daily in winter. On pasture, no hay and slightly less corn is needed.

From 2 weeks before farrowing through weaning, feed 60 percent tankage free choice along with other mixed supplement in pellet or meal form. From 2 days before farrowing till 2 days after, feed a more bulky ration of ground oats including molasses.

Another workable ration: Mix equal parts by weight of corn, oats, and good quality alfalfa. Self-feed during gestation along with 3/4 to 1 pound protein supplement daily.

EAR MARK all gilts from litters of 9 or more where the sow has at least 10 sound teats.

VACCINATE ALL HOGS for cholera -- double treatment preferred. For erysipelas, if a problem.

CREEP FEED pigs as soon as they will eat -- usually around 10 days of age. Ration should contain a mixture of antibiotics until pigs weigh at least 75 pounds or are 10 to 12 weeks old.

Self-Feeders for protein should be large -- 100 bushel capacity is recommended. A good mixture for nursing pigs developed by Iowa State College and used successfully is:

Ground corn	450 lbs.	Ground limestone	20 lbs.
Hulled oats	1000 lbs.	Steamed bonemeal	30 lbs.
Fish meal (60 percent)	50 lbs.	Salt (iodized)	10 lbs.
Soybean meal	400 lbs.	Trace mineral mix	4 lbs.
Antibiotic vitamin pre-mix	30 lbs.		

This pig starter should be self-fed free choice with shelled corn and plenty of water. Nothing else is needed.

The antibiotic vitamin pre-mix per ton of feed should contain:

Vitamin A	5 Mil. Units	Niacin	60 Grams
Vitamin D	2 Mil. Units	Pantothenic Acid	6 Grams
Vitamin B_{12}	40 Miligrams	Choline Chloride	150 Grams
Riboflavin	6 Grams	Antibiotics	40 Grams

Commercial mixes containing all these ingredients are available on the market.

Protein Supplement may be bought ready mixed from reliable manufacturers. But a saving can often be made by having it custom-mixed by a local elevator or feed dealer, if you have enough volume. Mixture used successfully is: 400 pounds fish meal (very important); 400 pounds of tankage or meat scraps; 200 pounds linseed meal; 800 pounds soybean meal; and 100 pounds simple mineral. This supplement containing 46 percent protein can be creep fed to pigs and self-fed to market hogs.

LOW COST MINERAL MIXTURE should be self-fed at all times: one part salt, two parts steamed bonemeal, two parts finely ground limestone.

EFFICIENCY FACTORS

Factor	Good	Very Good
Pigs weaned per sow per year	14 to 16	16 to 18
Birth weight lbs. per pig	2½ to 2-3/4	2-3/4 to 3
Weaning weight lbs. per pig	32 to 35	35 to 38
Days to market weight--225 lbs	200	180

Standard feed requirements	Corn	Protein
Per 100 lbs pork sold (inc. breed. herd)	7½ Bu.	40 Lbs.
Per hog marketed at 225 lbs (inc. breed. herd)	17 Bu.	90 Lbs.
From birth to weaning at 35 lbs (Fall	40 Lbs	5 Lbs.
(per pig) (Spring	40 Lbs	7 Lbs.
From weaning to market at 225 lbs (Fall[2]	13.0 Bu	80 Lbs.
(Spring[3]	11.5 Bu	60 Lbs.

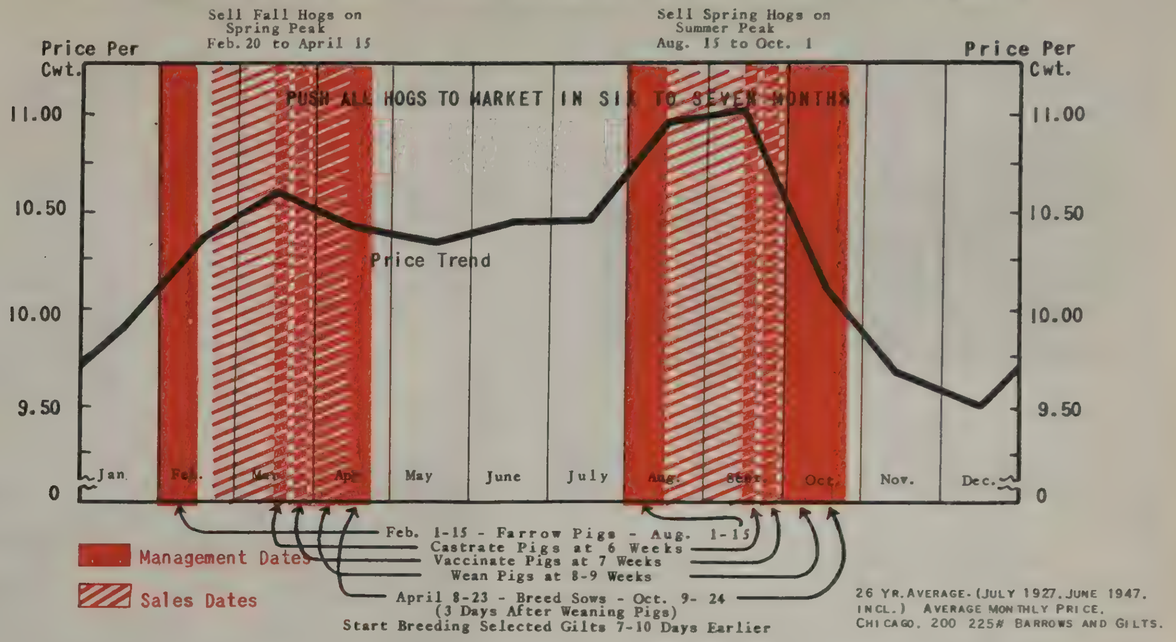
All Factors Based on Authoritative Data and Experience

[1] Based on No. 1 tankage or equivalent

[2] Fall pigs receive 40 lbs. of good legume hay

[3] Spring pigs in good pasture

DOANE TWO-LITTER HOG SYSTEM



26 YR. AVERAGE. (JULY 1927. JUNE 1947. INCL.) AVERAGE MONTHLY PRICE. CHICAGO. 200 225# BARROWS AND GILTS.

The Doane Two-Litter Hog System outlined above and developed in detail on the following page is presented to our Digest Clients as a proved practical system of handling hogs profitably.

It has been found that the most economical pork producing unit is comprised of 30-32 sows which makes the foundation for a well balanced program carried out on 40 acres of land. A herd of 20-25 sows is most satisfactory for the average large scale family unit. The principles outlined here, however, apply regardless of the size of the operation.

No livestock program is carried on with such narrow margins in timing. Brood sows must be bred at just the right time, pigs must be castrated, vaccinated, and weaned at the right time, otherwise the whole system will fall out of balance. Management must be continually alert for diseases and all factors which tend to throw the system out of line. Final success depends upon timely execution of the entire program.

EFFICIENCY FACTORS

FACTOR	GOOD	VERY GOOD
PIGS PER SOW PER YEAR	14 TO 16	16 TO 18
HOGS SOLD PER SOW PER YEAR	10 TO 12	14 TO 16
BIRTH WEIGHT LBS. PER PIG	2½ TO 2-3/4	2-3/4 TO 3
WEANING WEIGHT LBS. PER PIG	32 TO 35	35 TO 38
DAYS TO MARKET WEIGHT - 225 LBS.	200	180

STANDARD FEED REQUIREMENTS	CORN	PROTEIN[1]
PER 100 LBS. PORK SOLD (INC. BREED. HERD)	7½ BU.	40 LBS.
PER HOG MARKETED AT 225 LBS. (INC. BREED. HERD)	17 BU.	90 LBS.
FROM BIRTH TO WEANING AT 35 LBS. (FALL	40 LBS.	5 LBS.
(SPRING	40 LBS.	7 LBS.
FROM WEANING TO MARKET AT 225 LBS. (FALL[2]	13.0 BU.	80 LBS.
(SPRING[3]	11.5 BU.	60 LBS.

ALL FACTORS BASED ON AUTHORITATIVE DATA AND EXPERIENCE

[1] BASED ON NO. 1 TANKAGE OR EQUIVALENT
[2] FALL PIGS RECEIVE 40 LBS. OF GOOD LEGUME HAY
[3] SPRING PIGS IN GOOD PASTURE

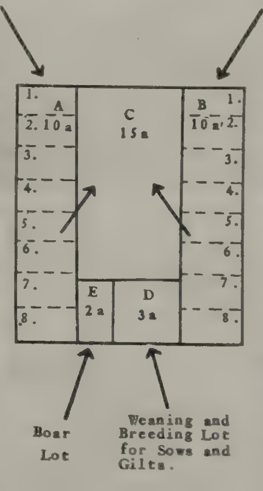
An efficient field plan for handling hogs using this system is shown in the diagram of a 40-acre unit below. However, the Doane Two-Litter Hog System can be readily adapted to almost any set of conditions so long as sanitary standards are not relaxed. The Ten Points for Profit on the next page apply whether the farm is producing one ton or 800 tons of pork per year.

DOANE TWO-LITTER HOG SYSTEM 40 ACRE UNIT (32 SOWS)

Clover field -not used for hogs in past 2 years. First divide the unit into five fields (A, B, C, D, and E)

FOR SPRING FARROWING

Fence field A into eight 4-sow lots before ground freezes. Bring sows to farrowing lots January 15. As weaned, move sows to field D. Move pigs to range on field C a week later. Remove lot fence from field A. Give sows and boars range of field A after spring and fall breeding



FOR FALL FARROWING

Divide field B into eight 4-sow lots after harvesting hay crop. Bring sows to farrowing pen July 15. As weaned, move sows to field D. Give pigs range of fields B and C. Remove lot fences and set them up on a new 40-acre unit before the ground is frozen.

Fencing should be 32-inch woven wire with 6-inch stave, No. 9 top and bottom, No. 10 filler. Use 39-inch woven wire of same specification around boar pens.

Use 5-foot steel posts in all fence construction to save labor.

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10 POINTS FOR PROFIT

WITH THE DOANE TWO-LITTER HOG SYSTEM

1. Sanitation is of primary importance. Use movable hog houses and equipment on clean clover ground for farrowing and raising healthy, fast growing hogs.

DOANE PHOTO

HOGS ON PASTURE

Many a hog producer has been successful with any one of a number of breeds, but no one has produced pork at a profit for any length of time without practicing sanitary measures.

2. Separate sows two weeks before farrowing by using lots one to two acres in size to accommodate four sows with pigs until weaning time.

3. At farrowing time, keep a man with the sows both day and night to save a larger number of pigs per litter. Begin five to ten days before the first sows are due to farrow. If a cold wave strikes, be prepared to keep two men with the sows at all times. Heat lamps and electric brooders will save an average of 1½ more pigs per sow from winter litters. If no electricity -- use barrel and jug of hot water.

DOANE PHOTO

Doane Movable Equipment - Ear Corn Feeder 100 Bushel Feeder - Watering Sled.

4. Ear-mark all gilts from large litters and good mothers to help in selecting and improving brood stock and raising more pigs per sow.

5. Begin creep-feeding pigs at two weeks of age, castrate at six weeks, vaccinate at seven weeks, and wean at eight to nine weeks.

A GOOD CREEP-FEEDING PEN CAN BE MADE BY PLACING PANELS AROUND TROUGHS WITH OPENINGS AT ALL FOUR CORNERS. USE STEEL POSTS TO SAVE LABOR.

6. Begin weaning sows October 7 and breeding October 10 for February 1 litters, and weaning April 6 and breeding April 9 for August 1 litters so the pigs will be ready to go to market during the period of highest prices. Cover unexpected losses by breeding 15 per cent additional sows and gilts.

DOANE PHOTO

Doane hog shelter being used for summer shade Although battered up a little, it's still structurally sound after eight years of constant service. For winter use, a movable panel is bolted across the north end of the alley.

7. Use economical, home-grown feeds, balanced with protein supplement and low-cost, simple mineral mixture for most economical gains. See below.

8. Feed hogs over rotation legume pasture area by using movable self feeders and waterers for sanitation and better distribution of the manure.

9. Full-feed in order to market spring litters during August and September and fall litters in February, March and April for highest hog returns. The spring peak is less dependable than the fall high but by having the hogs ready early it is possible to go anytime market trends justify.

10. Keep continually on the alert for hog diseases, and keep all factors timely and in balance for continued profitable operation.

HOW TO FEED HOGS FOR PROFIT

BREEDING HERD IN WINTER QUARTERS
Corn-3½-4 lbs.(8-10 ears)-ea.per d.
Protein Sup.- ½ lb.- ea. per day
Alfalfa Meal- ½ lb. - ea. per day

BREEDING HERD ON CLOVER PASTURE
Corn-3-3½ lbs.(6-8 ears) ea.per day
Protein Sup. - ½ lb. ea. per day

BROOD SOWS BEFORE FARROWING
Ten days before sows farrow, replace one-half of corn with slop made with ½ lb. bran, 1 lb. shorts and 1 lb. ground oats - ea. per d.

BROOD SOWS AT FARROWING
Keep plenty of warm water before sows at all times. Feed only a thin slop. The total feed intake should not exceed ½ lb. bran, 1 lb. shorts, 1 lb. ground oats, and ¼ lb. alfalfa meal - ea. per day

BROOD SOWS AFTER FARROWING
After 48 hours, start sow on full feed slowly. Keep her on full feed until pigs are weaned. Feed free-choice corn and a supplement made of 2 parts protein supplement and 1 part (by weight) alfalfa meal.

BOARS DURING BREEDING SEASON
Corn - full feed
Protein Sup. - ½ lb. ea. per day
Alfalfa meal - ½ lb. ea. per day

PIGS - CREEP FEEDING
free choice in troughs

Protein Supplement
Finely ground small grain and shorts, 50,50
Alfalfa meal

FATTENING HOGS ON FULL FEED
Corn - either ear or shelled in self-feeder
Protein Supplement -in self-feeder
Shorts and ground small grain - equal parts - in self-feeder until pigs weight 80 lbs., after that feed only corn and supplement.
Alfalfa Meal - add to protein supplement as pastures dry up in fall. Increase the amount gradually until the proportion is 3 parts protein supplement to 1 part (by weight) alfalfa meal when the pasture fails.

MINERAL SUPPLEMENT
in self-feeder at all times

One part salt
Two parts steamed bone meal
Two parts limestone dust

SOLVING PROBLEMS OF --

MODERN HOG MANAGEMENT

ONE, TWO, OR THREE LITTERS PER YEAR

Two litters mean more work and more headaches. But you can produce more pork on a given acreage with greater returns than with a one litter system.

The two litter system fits in best where: labor is plentiful and your lots are adequate to keep different hogs separate; hogs are your most profitable enterprise; volume is too small with one litter; other work is heavy in May and June; or where breeding stock is sold.

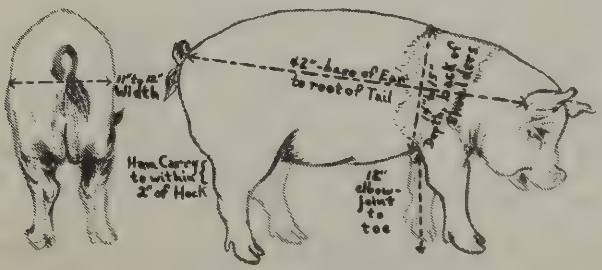
The one litter system fits best in the opposite of the above situations; when February and March weather is extremely cold; if you find it hard to follow a close schedule; if you have had little experience; or if hogs are handled as a side line.

A three litter system of spring, summer, and fall farrowing can be worked out by combining the one and two litter systems. It spreads labor and marketings over three seasons and uses buildings, equipment, and boars to maximum.

"Whatever the plan, average net returns under good management do not differ greatly ... but remember ... it's hard to make money with hogs raising them at higher 2 litter costs and selling them at the lower 1 litter prices." -- Purdue University

Successful Pork Production depends first upon selection of good breeding stock. Separate gilts from fattening hogs at 4 to 5 months of age. Select from large uniform litters. Aim for the type that will produce a good market hog.

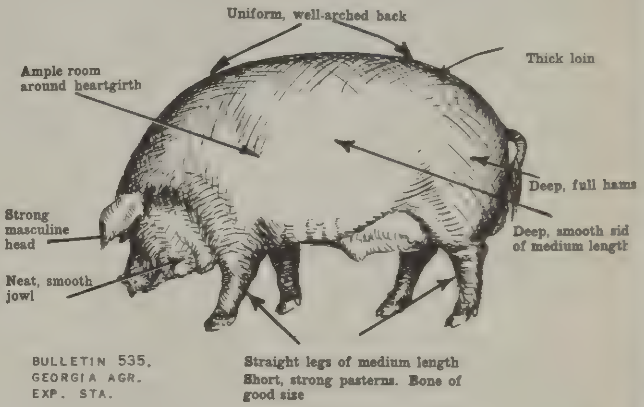
WHAT TO LOOK FOR IN 200-225 POUND HOG


11" to 12" Width
42" - base of Ear to root of Tail
Depth
Back of Shoulders
Ham Carry to within 2" of Hock
18" elbow-joint to toe

This is the hog we should be aiming for. It is ready for market at a live weight of 200 to 225 pounds. Live hogs less than 40 inches in length at this weight are likely too fat.

"The sire is half the herd", holds true for hogs just as for all livestock. The boar will stamp his characteristics on every pig he sires -- half the qualities of the entire pig crop are transmitted by the herd boars used. Do not confine the boar too closely. Allow him enough yard to exercise.

A Good Breeding Boar


Uniform, well-arched back
Thick loin
Ample room around heartgirth
Deep, full hams
Strong masculine head
Deep, smooth sid
of medium lengt
Neat, smooth jowl
Straight legs of medium length
Short, strong pasterns. Bone of good size

BULLETIN 535,
GEORGIA AGR.
EXP. STA.

Yearling or mature boars can breed three sows a day. Boars under a year old should be limited to one service daily. Over-working the boar will result in small litters or failure of sows to settle. Give the working boar at least one pound of protein supplement every day.

Crossbreeding, to produce market hogs, has become a common practice. Opinions differ among breeders, producers, farm managers, and research workers as to whether crossbreeding for market hog production is desirable.

"Although the data are not regarded as providing the final answer, ... rotating purebred sires of three or more breeds on sows selected from the herd is worthy of consideration.

"Any merit crossbreeding has is the result of the pure breeding that has preceded it. For any improvements that are made, ... the producers of crossbreds must depend on the breeders of purebred ... lines." -- Ohio Experiment Station, Bulletin 675.

The Critical Times in hog feeding are just before breeding, during gestation, and during the suckling period. A growing gilt should receive good hay or pasture plus whole oats and enough corn to keep her gaining in weight.

(Continued On Back)

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BREEDING HERD MANAGEMENT

From 1/3 to 1/2 pound of protein supplement is needed daily in addition to what she gets on pasture and from grain. (Supplement should be from animal sources or contain vitamin B_{12} plus anti-biotics.)

Pregnant gilts should gain 1 to 1½ pounds per day during the 112-115 day gestation period. Gain on older sows should be about 1 pound daily depending on condition at breeding time. Keep sows from getting too fat --feed bulkier feeds and make them exercise by feeding 40 rods or more from housing.

Self feeding bred sows saves labor. One good ration for dry lot or winter feeding is a mixture of ground oats, ground alfalfa, and ground shelled corn (600 pounds of each) with 200 pounds of protein supplement. Self feed minerals free choice.

Another method is to mix 600 pounds of ground alfalfa, 600 pounds of ground oats, and 100 pounds of protein feed. Amount of ear corn fed depends upon the condition of the sows.

For pregnant sows on pasture, a good feeding plan is to self feed whole oats and minerals, and hand feed ear corn and one-third pound supplement daily. On good pasture, the supplement can be omitted from the ration until about 2 months before farrowing.

A good mineral mixture for hogs on pasture is: 20 pounds iodized salt, 40 pounds finely ground limestone, and 40 pounds steamed bone meal. In dry lot, winter feeding, or on poor pasture, 3.5 pounds of trace mineral mix is recommended. This may contain 1.35 lb. ferrous sulfate, 1 lb. magnesium carbonate, .2 lb. potassium carbonate, .2 lb. copper carbonate, .6 lb. manganese sulfate, .1 lb. cobalt chloride, .05 lb. zinc carbonate.

Electric Pig Brooders will reduce little pig losses by 50 per cent in cold weather. They prevent chilling, crowding and crushing -- cause of 40 per cent of total pig losses.

Heat Lamps And Brooders Help Save Pigs

Heat lamps are just as good as brooders for protecting and saving baby pigs. Heat lamps of the 150 watt reflector type, 250 watt infrared heat bulb without reflector, and the conventional brooders with 150 watt light bulb, seemed equally good in tests at the University of Illinois farm.

When heat lamps are used, caution must be taken not to overheat the pigs. Bulbs should hang at least 24 to 30 inches from the floor. Check floor temperature to make sure it's not over 75 to 80° F. Hanging bulbs are easier to install, work around, and clean under, but operating costs are slightly higher.

Anemia will occur in little pigs confined to the farrowing pen for two or three weeks when they receive nothing but sows' milk. Symptoms are thumping sides, shrunken flesh, and rough hair. Affected pigs die within a few days. To prevent losses, place some fresh sod or dirt in the pen every few days. The pigs will root over it and get the minerals they need. Pigs raised on pasture are seldom anemic.

Feeder Pigs can be purchased and fed out successfully if they are from good breeding stock and in good healthy condition. Those raised in pig hatcheries are most likely to meet these requirements. When buying feeder pigs at community sales and public stockyards, be sure of what you are getting. Some will be good pigs. Others will lack feeding quality and good health. They may be diseased or wormy pigs that the owners wisely disposed of.

Pig Hatcheries offer an economical way to do away with the care and handling of brood sows. Pigs are bought at weaning age and finished off to market weight.

Feeder pigs are shipped regularly from feed deficit areas of Missouri, Kentucky, Minnesota, and other neighboring states, into the Corn Belt. Now some Corn Belt farmers are going into pig hatchery production. Buyers come right to their farms.

Sanitation is a must for successful hatching operations. To operate a pig hatchery requires good management and skill in handling sows and producing thrifty pigs. Pigs are usually raised in confinement. The danger from diseases and parasites may be less this way. But feeding problems and labor requirements are increased.

Farrowing schedules vary with different hatchery operators. Some have sows farrowing every month -- others every 2 or 3 months. Although equipment gets much fuller use than with the usual one or two litter system, the margin of profit is small. Large volume is necessary to provide an adequate income. One Iowa hatchery plans to farrow 20 sows a month. Satisfied customers are the best advertising.

SELECTION, MANAGEMENT, AND FEEDING OF BREEDING HOGS

An early March pig, weighing 170 pounds at four months of age. A good prospective herd boar.

Selecting the Herd Boar

The herd boar should be purebred and properly marked in his breed standards. He should be masculine in appearance, active, deep in body, and uniform in width. His legs should be medium in length and bones larger than that of sows or gilts. Whenever possible examine the sire and the dam of a prospective young herd boar for desirable feeding and market type, constitutional vigor, and prolificacy.

A good boar will transmit to his pigs what he inherits from his ancestors. Do not use boars that are too small, fine in bone, and have been stunted in growth.

The Herd Boar in the Breeding Season

Young herd boars should be at least nine months old or older when first used for breeding purposes. They should be in good health, medium condition, active, and weigh 250 or more pounds. The most successful practice in the breeding season is to keep the boar confined to his own lot or pasture and when a sow or gilt is ready for breeding, about the second day of "heat", move her in with him. One service is generally sufficient.

An active young herd boar, when properly fed and managed, may breed 15 to 20 sows in a breeding season. He should not breed more than one sow a day. Yearling or active older boars may breed two sows daily and 20 to 25 or 30 sows in a breeding season. In herds of 30 or more sows, two boars should be used. Breeding too many sows to one boar for several days may result in unsatisfactory litters.

Feeding the Herd Boar

Feeding the herd boar does not differ from that of the sows. Corn, oats, meat and bone scraps, and about ¼ of the ration of ground wheat or middlings make a good feed. The boar should always be kept in thrifty condition. Neither too fat or too thin as either extreme may injure his breeding ability. Give boars an abundance of room in a lot or pasture for exercise. This is necessary for good health.

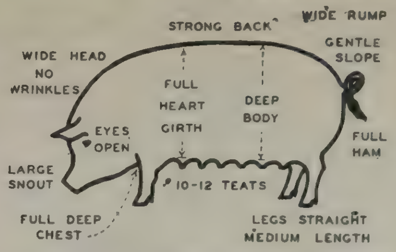
Feed Values

What can I afford to pay for hominy feed when corn is 60c a bushel?

Corn and hominy feed are pound for pound equal in feeding value as shown by Purdue comparative hog feeding trials. There are 35.7 bushels of shelled corn in a ton. Multiply 35.7 bushels by 60c and the result is $21.42. This is the price you can pay.

Ground wheat and high-grade flour middlings are equal pound for pound as a feed for pigs. To determine the price a farmer can afford to pay for a ton of middlings, multiply the number of bushels of wheat in a ton (33.3 bushels) by the cost of a bushel of wheat. Add to this result the cost of grinding.

What price can I afford to pay for a gallon of skim milk when tankage is selling at $50.00 a ton, or $2.50 for 100 pounds? One hundred pounds of high grade 60 per cent protein tankage is equal in feeding value to 1,000 pounds of skim milk. This amount of milk contains 116.3 gallons. Dividing the cost of 100 pounds of tankage, or $2.50 by 116.3 we have 2.15 cents, the comparative value of a gallon of skim milk. Note—100 pounds of skim milk contains 90 pounds of water.



The body of a hog should be uniform in width and practically free from wrinkles. The head of a boar is generally wider than that of a sow and masculine in appearance, while sows are more refined in head and body.

Helpful Hints

Helpful hints gleaned from experience:

a. Good purebred boars are more dependable in transmitting their desirable characters to their offspring than those of inferior breeding.

b. Often one or two sows in a herd produce large litters of pigs that excel others in vigor, growth, and quality. Selecting the most promising gilts out of such litters for breeders is herd improvement.

c. A herd book record of sows from which breeding pigs are to be selected, showing the number of pigs raised and the litter weight at five months, eliminates guess work.

d. A purebred boar mated to purebred sows of another breed will produce crossbred pigs.

e. Experimental trials show that crossbred pigs are generally vigorous, growthy, and economical in producing gains.

f. Crossbreeding does not rectify the practice of using inferior boars and sows.

g. For vigorous pigs a protein feed in the ration through the entire gestation period is essential.

h. Handle brood sows kindly. It makes them easier to manage.

Housing

Barns, sheds, or individual houses may be used to shelter sows and boars during the cold months. Sleeping quarters should have a dry floor and they should be wind tight on the east, west, and north sides. An abundance of dry bedding, wheat straw, or corn fodder, is very important in keeping sows contented and from "piling up". It takes more feed when sleeping quarters are not comfortable.

Water

Plenty of drinking water is essential for health and gains of breeding hogs. Watering in troughs two or three times daily is sufficient in the fall, winter and early spring. During the summer a water fountain or other constant supply of fresh water is recommended.

Exercise

Sows bred in the fall need plenty of range for exercise. Turning sows into corn stalk fields is a good practice. Another good plan is to locate the sleeping quarters about 25 to 30 rods away from the place of feeding. Comparative trials show that pigs from gilts allowed to exercise in fields produced more vigorous pigs than those from gilts confined to small pens.

Self Feeding Bred Sows

Generally it is not advisable to full-grain feed sows, with self feeders, during the gestation period. They often do not exercise enough or become tame for easy handling.

How Much to Feed

Bred sows should always be fed enough to maintain a thrifty medium condition. At the Purdue University Experimental Swine Farm sows averaging 461 lbs. required 6.25 lbs of grain per head daily or 1.36 lbs. daily for each 100 lbs. of live weight. Gilts averaging 311 lbs. required 5 lbs. of grain per head daily or 1.61 lbs. for each 100 lbs. These sows were fed a mixture of approximately 64 lbs. of shelled corn, 31 lbs. whole oats, and 5 lbs. tankage. It required 6.4 bushels of corn, 5.6 bushels of oats, and 28 lbs. of tankage for each sow or gilt during the gestation period of 113 days.

A gilt of desirable type to produce rapid gaining pigs when full-fed from start to market finish at 180 to 225 pounds.

Selecting Breeding Gilts and Sows

The breeding of gilts or sows to produce market hogs may be purebred or high grade. Select only those from litters of eight or more pigs. Sows should be medium in type, feminine; their bodies should be deep, uniform in width, and practically free from wrinkles. Breeding gilts or sows should have the ability, with proper feeding and care, to suckle eight or more vigorous pigs. Do not use gilts that are shallow in body with very long legs or those that are too small or chuffy.

It is a good practice to ear notch or mark for identification the gilt pigs from sows with large litters of the most vigorous or growthy pigs, then, several months later select the most promising of these gilts for the breeding herd.

Gilts and Sows at Breeding Time

Gilts should be large for their age and bred not younger than 8½ to 9 months of age. Sows and gilts in medium condition respond more readily in the breeding season when their ration is increased to gain about ¾ to 1 pound per head daily. The oestrus or heat period is about three to four days and under normal conditions recurs in 21 days. Breeding tests show that best results are usually obtained when sows are bred in the second day of "heat".

Date of Breeding

Six months or less is generally considered enough time to successfully raise and finish pigs for market in this state. To sell finished spring pigs about September first, the farrowing season would be six months previous or early in March, and the breeding season 113 days previous to farrowing, or the first two weeks in November. The date of breeding and the date due to farrow should be recorded in a herd record book. Pigs may be finished at most desirable market weights 9½ months after the breeding season.

Feeding Sows

In the breeding season and during the gestation period, the following feed mixture is suggested:

1 bushel of whole or coarsely ground corn.
1 bushel of whole or coarsely ground oats.
5 pounds of meat and bone scraps or tankage.
20 to 25 lbs. of wheat middlings or ground wheat, or bran may be used in place of the bushel of oats.

A very satisfactory protein feed mixture to replace the above meat and bone scraps is made as follows:

20 lbs.	meat and bone scraps
20 lbs.	fishmeal
40 lbs.	soybean oilmeal
10 lbs.	cottonseed meal
10 lbs.	alfalfa meal

One-half gallon to a gallon of skim milk per sow daily may be fed in place of either of the above protein feeds. When feeds are not mixed, ¼ to ⅓ lb. of protein feed may be fed daily per sow or gilt in troughs.

Other protein supplements equally as efficient may be fed in the same amounts.

It is practical to feed bred sows bright alfalfa or clover hay when pasture is not available.

Minerals for Bred Sows

A suitable mixture is made of 10 lbs. of pulverized limestone, 10 lbs. of steamed bone meal, and 1 lb. of common salt. Feed minerals and extra salt free-choice in a self-feeder.

Purdue University Leaflet No. 219 By J. W. SCHWAB *Division of Animal Husbandry*

RATIONS FOR SWINE

Brood Sows During Gestation

Winter

1. Two-thirds shelled corn and one-third whole or coarsely ground oats by weight. Add 5 pounds of tankage to each 100 pounds of the grain mixture for mature sows, and 6 to 8 pounds of tankage for younger sows—the larger amount for gilts.
   Ear corn may replace shelled corn in this ration—in which case the oats and tankage should be mixed and fed in troughs.

   Feed the sows for medium condition of flesh. As a rule about 1.35 pounds of grain daily for each 100 pounds of live weight is sufficient to keep pregnant sows in medium condition. Gilts require about 1.85 pounds per 100 pounds live weight.

2. Good quality alfalfa or clover hay fed in slat racks or on feeding floor with enough corn or other grain to keep the sows in medium condition, and about one-fourth to one-third of a pound of tankage to a sow daily. The amount of tankage should vary according to the age of the sow and the amount of legume hay consumed. Gilts require more tankage than mature sows.

Summer

3. Plenty of good pasture, preferably legume, and enough corn or other grain to keep the sows in medium condition of flesh makes a good ration. This ration, however, should be safeguarded, especially for young sows and gilts, by supplying one-fourth of a pound of tankage per sow daily during the last six weeks of the gestation period.

Feed a good mineral mixture in self-feeder as a supplement to these rations for brood sows.

Sows and Pigs During Nursing Period

Rations to be hand-fed* to sows, and self-fed, in creep, to pigs.
Pasture, preferably legume, should be provided for sows and pigs whenever the growing season permits.

1. 35 pounds shelled corn
   35 pounds coarse-ground corn
   20 pounds wheat middlings or coarse-ground oats or ground hulled oats
   10 pounds tankage or meat and bone scraps
   If pigs sort out the shelled corn and waste the ground feed, use Ration 2 instead.
2. 70 pounds coarse-ground corn
   20 pounds wheat middlings or coarse-ground oats or ground hulled oats.
   10 pounds tankage or meat and bone scraps
   Feed this mixture in self-feeder with some ear corn or shelled corn on the ground.
   If the ground oats are used in Rations 1 and 2 for very young pigs, it is advisable to sift out the coarser hulls. Another plan is to feed wheat middlings for two or three weeks and then change to the coarse-ground oats, if oats are cheaper than middlings.
3. 70 pounds coarse-ground corn
   20 pounds coarse-ground wheat
   10 pounds tankage or meat and bone scraps
   Feed this mixture in self-feeder with some ear corn or shelled corn on the ground.
   Where wheat is available at a price not exceeding the price of an equal weight of wheat middlings this ration is recommended. If wheat is cheaper than corn it may replace a part or all of the corn in this mixture—in which case the tankage may be reduced slightly.

Feed a good mineral mixture in separate self-feeder with each of these rations for suckling pigs.

*Where sows are nursing large litters and are not inclined to become over-fat, self-feeding is recommended. In cases where it seems necessary to breed sows before they wean their pigs, self-feeding helps to make this procedure possible.

Weaned Pigs

With Pasture

1. 70 pounds coarse-ground corn
   20 pounds coarse-ground wheat, ground oats, or wheat middlings
   10 pounds tankage or meat and bone scraps or the following mixed supplement:
   20 pounds meat and bone scraps, 20 pounds fish meal, 40 pounds soybean oil meal, 10 pounds linseed oil meal, and 10 pounds cottonseed meal

Without Pasture

2. 70 pounds coarse-ground corn
   20 pounds coarse-ground wheat or ground oats or wheat middlings
   10 pounds of one of the following supplements:
   (a) 40 pounds meat and bone scraps, 50 pounds soybean oil meal, and 10 pounds alfalfa leaf meal
   (b) 20 pounds meat and bone scraps, 20 pounds fish meal, 30 pounds soybean oil meal, 10 pounds linseed oil meal, 10 pounds cottonseed meal, and 10 pounds alfalfa leaf meal

Coarse-ground wheat may replace a part or all of the corn in these rations. Allow the pigs access to a good mineral mixture in self-feeder.

Fattening Hogs

With Pasture

1. Full feed of ear corn on ground or shelled corn in self-feeder, free-choice with either tankage, meat and bone scraps, fishmeal, or a good mixed supplement such as 20 pounds meat and bone scraps, 20 pounds fish meal, 40 pounds soybean oil meal, 10 pounds linseed oil meal, and 10 pounds cottonseed meal.
2. Full feed of ear corn on ground or shelled corn in self-feeder, supplemented by all the skim milk or buttermilk the hogs will drink in two feedings a day.
3. Full feed of ear corn on ground or shelled corn in self-feeder, free-choice with whole soybeans or soybean oil meal and a good mineral mixture. (For hogs weighing 75 pounds or more.) If soybeans are roasted, limit to ½ pound per head daily.
4. Free-choice of coarse-ground wheat, shelled corn, and tankage or other similar supplement in self-feeder. Ear corn fed on ground may replace shelled corn in this ration.

Without Pasture

5. Full feed of ear corn on feeding floor or shelled corn in self-feeder, supplemented with tankage, or meat and bone scraps, or the following mixture in self-feeder:
   20 pounds meat and bone scraps, 20 pounds fish meal, 40 pounds soybean oil meal, 10 pounds cottonseed meal, and 10 pounds alfalfa leaf meal
6. Free-choice of coarse-ground wheat, shelled corn or ear corn, and the following supplementary mixture:
   40 pounds meat and bone scraps or tankage, 50 pounds soybean oil meal, and 10 pounds alfalfa leaf meal
7. 75 pounds coarse-ground corn
   25 pounds coarse-ground oats or ground hulled oats
   10 pounds tankage or meat and bone scraps
8. Full feed of corn supplemented by all the skim milk or buttermilk the hogs will drink in two feedings a day, and some good quality alfalfa, clover, or soybean hay fed in rack or on feeding floor.
9. Shelled corn, whole soybeans or soybean oil meal, and a good mineral mixture free-choice in self-feeder. (For hogs weighing 125 pounds or more.) If good quality alfalfa or clover hay is available, feed in slat rack or on feeding floor as a supplement to the grain ration. If soybeans are roasted, limit to ¾ pound per head daily.

DEPARTMENT OF ANIMAL HUSBANDRY PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION
Leaflet No. 156 Leaflet No. 181

Mineral Mixtures for Hogs

Purdue No. 2—10 pounds hardwood ashes
10 pounds 16 per cent or 20 per cent superphosphate
1 pound common salt.

Purdue No. 6—10 pounds pulverized limestone
10 pounds special steamed bone meal
1 pound common salt

Give hogs free access to pressed block salt or other form of salt when feeding these mineral mixtures. If all of the salt is to be fed in the mineral mixture, double the amount of salt indicated.

Never let hogs get hungry for salt. Keep it before them at all times.

COMPARATIVE VALUES OF FATTENING FEEDS FOR HOGS (SHELLED CORN USED AS A STANDARD FOR COMPARISON)

Feed	Number of bushels in a ton	Relative fattening value for hogs	Approximate value when a bushel of corn is worth					
			$0.20	$0.40	$0.60	$0.80	$1.00	$1.20
		per cent*	bu.	bu.	bu.	bu.	bu.	bu.
Shelled corn	35.7	100	$0.20	$0.40	$0.60	$0.80	$1.00	$1.20
Ground wheat	33.3	105	.23	.45	.68	.90	1.13	1.35
Ground barley	41.7	90–95	.16	.32	.48	.63	.79	[illegible]
Ground rye	35.7	90	.18	.36	.54	.72	.90	1.08
Ground oats	62.5	60–80	.08	.16	.24	.32	.40	[illegible]
			ton	ton	ton	ton	ton	ton
Hominy feed		100	$7.14	$14.28	$21.42	$28.56	$35.70	$42.84
Wheat middlings		75–85	5.71	11.42	17.14	22.85	28.56	34.27

NOTE—The price figures for barley, oats, and wheat middlings are based on average fattening values.
Wheat, rye, and barley should be ground. Coarse-grinding is recommended. It is not necessary to grind corn.
Wheat middlings have a higher value as a supplementary feed than as a fattening feed, and are commonly used to supplement corn rather than substitute for it.

* With corn as a standard at 100 per cent, a like weight of wheat has a feeding value of 105 per cent, rye 90 per cent, and so on for the other feeds. The price values at the right are based upon the percentage values shown in the second column.

COMPARATIVE VALUES OF PROTEIN SUPPLEMENTS FED WITH CORN TO FATTENING HOGS IN DRY LOT

Feed	Rank in order of efficiency for gain production	Approximate number of pounds to equal 100 lbs. of 60% tankage	Approximate value when 100 lbs. of 60% protein tankage is worth				
			$2.00	$2.50	$3.00	$3.50	$4.00
			100 lbs.	100 lbs.	100 lbs.	100 lbs.	100 lbs.
Skim milk	1	*1,000	$0.20	$0.25	$0.30	$0.35	$0.40
Buttermilk							
Fish meal	2	85	2.35	2.95	3.55	4.10	4.70
Tankage	3	100	2.00	2.50	3.00	3.50	4.00
Soybeans, if fed with mineral	4	150	1.35	1.65	2.00	2.35	2.65
Soybean oilmeal, if fed with mineral							
Linseed oilmeal	5	175	1.15	1.40	1.70	2.00	2.30

Soybeans weigh 60 pounds to the bushel. Skim milk and buttermilk weigh approximately 8½ pounds to the gallon.
Soybeans may be fed either whole or ground with about the same results. They should make up not more than 14 per cent of the fattening ration on account of the danger of producing soft pork. To guard further against soft pork, hogs should weigh 100 pounds or more when started on a ration containing soybeans.

* Skim milk and buttermilk contain 90 per cent water.

DIGESTIBLE VALUES OF HOG FEEDS

Feeding Stuff	Fiber	Digestible nutrients in 100 lbs.			Nutritive ratio	General use in hog rations
		Crude protein	Carbohydrates	Fat		
	per cent	lbs.	lbs.	lbs.	1:	
Corn	1.9	7.5	67.8	4.6	10.40	Fattening feeds for fat, heat and energy production
Hominy feed	4.4	7.0	61.2	7.3	11.1	
Wheat	2.0	9.2	67.5	1.5	7.7	
Barley	4.6	9.0	66.8	1.6	7.8	
Rye	1.8	9.9	68.4	1.2	7.2	
Oats	10.9	9.7	52.1	3.8	6.3	
Wheat middlings (standard shorts)	6.0	13.4	46.2	4.3	4.2	Intermediate feeds for variety, bulk, palatability or general balance in the ration
Wheat middlings (flour)	4.7	15.7	52.8	3.1	5.0	
Rye middlings	4.6	12.5	55.5	3.1	5.0	
Corn germ meal	9.0	16.5	42.6	10.4	4.0	
Wheat bran	8.8	12.5	41.6	3.0	3.9	
Alfalfa meal	30.1	10.2	38.7	0.8	4.0	
Soybeans	4.3	33.2	24.7	16.1	1.8	Supplementary feeds rich in protein, for growth and milk production
Soybean oilmeal	5.3	39.7	34.7	4.5	1.1	
Linseed oilmeal	8.4	30.2	32.6	6.7	1.6	
Skim milk	0.0	3.6	5.1	0.2	1.5	
Buttermilk	0.0	3.4	4.9	0.1	1.5	
Tankage (60% protein)	5.[illegible]	56.2	....	7.2	0.3	

NOTE—Oats and middlings may be classed in either of the first two groups of feeds.

Pasture Crops for Hogs

Crop	Date of Seeding	Method of Seeding	Seed Required Per Acre	Approximate Time from Seeding to Grazing	Approximate Grazing Period
Alfalfa	Feb. to Aug.	Broadcast or drill	10 to 15 lbs.	3 to 4 months or next season after seeding	4 to 5 months for several seasons
Sweet clover	Feb. to Aug.	Broadcast or drill	10 to 15 lbs.	3 to 4 months	Remainder of summer and next season
Clover	Feb. to April	Broadcast	8 to 10 lbs.	4 months for spring seeding	Remainder of summer and next season
Oats	March to May	Drill or Broadcast	10 to 12 pecks	5 to 6 weeks	4 to 6 weeks
Oats and Canadian field peas	March to May	Drill or Broadcast	2 bu. oats; 1 bu. peas	6 to 8 weeks	4 to 5 weeks
Oats and rape	March to May	Drill or broadcast	6 to 8 pecks oats; 4 to 5 lbs. rape	6 to 8 weeks	Oats, 4 to 6 weeks Rape, until frost
Rape	April to July	Rows or broadcast	3 to 8 lbs.	6 to 8 weeks	2 to 4 months
Sweet corn and rape	Corn, May to June; Rape last cultivation	Corn, drill or check Rape, broadcast	Corn 6 to 8 lbs.; Rape 4 to 6 lbs.	8 to 10 weeks	4 to 6 weeks
Soybeans	May to July	Rows or drill solid	4 to 6 pecks	8 to 10 weeks	4 to 6 weeks
Corn and soybeans	May to June	Drill or check	Corn 7 to 8 lbs.; soybeans 4 to 6 lbs.	90 to 110 days	4 to 6 weeks
Sudan grass	May 10 to July	Drill in 14 inch rows	15 pounds	6 to 8 weeks	Until frost
Rye	Aug. to Nov.	Drill	6 to 8 pecks	Late fall and early spring	
Bluegrass	Usually seeded in grass mixtures on small grain				

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DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

HOW TO GROW THRIFTY SPRING PIGS

A Week Before Farrowing

Move sows to land or quarters where no hogs have been kept for at least one year to protect health of pigs and to prevent intestinal round worm infestation.

If farrowing quarters were used by hogs within one year, scrub them with boiling water and lye (1 pound lye to 15 gallons water). Dry pens before using. Blow-torches may be used to clean individual houses.

Farrowing quarters must be warm and dry for early spring farrowing to keep sows contented. Cover individual houses with straw or corn fodder if necessary.

To Protect Pigs From Over-Laying

Fasten guard rail of 2x4 inch timbers, poles, or iron pipe, 10 inches from walls and 10 inches above floor of pens.

Make a hover under which pigs will sleep as follows: Two 1x10 inch boards each 3 ft. long, nailed together at ends to form a right angle. Make a tight cover of boards or straw. Fasten securely in corner of pen. Use plenty of clean, dry, bedding under hover.

Having sows very tame for easy handling is important.

At Farrowing Time

Quarters should have a dry floor, clean, comfortable bedding, and other animals should be kept away.

Supply plenty of drinking water; feed sows sparingly and only when they want to eat during first day.

Equal parts of ground oats and wheat bran or bran alone, fed dry is excellent to feed for two to three days after farrowing.

After Farrowing

Keep sows contented with comfortable quarters, proper rations, and careful handling.

From five to seven days after farrowing, allow sows and pigs to exercise daily on sod or other clean ground. This helps to prevent anemia.

Feeding Sows During the Suckling Period

One bushel of shelled corn and 1 bushel of good oats, or 25 pounds of ground wheat or middlings, and 10 pounds of tankage is a practical ration. When ground wheat or middlings are fed, also coarse-grind the corn and mix feeds. Feed bright alfalfa hay in a low slatted rack when pasture is not available. When pigs start eating grain, feed sows all they will clean up.

Sows must have a liberal supply of water. It is as important as feed. Sows' milk is more than 80 per cent water.

Minerals For Sows

Ten pounds of pulverized limestone, 10 pounds of steamed bone meal and 1 pound of salt make a good mineral mixture. Do not mix with grain. Feed minerals and extra salt in self-feeder.

Start Feeding Pigs When Two Weeks Old

Good pig starters:

A. 70 pounds coarse-ground shelled corn.
   20 pounds coarse-ground wheat.
   10 pounds high-grade meat scraps or tankage.

B. 45 pounds coarse-ground corn.
   45 pounds coarse-ground wheat.
   10 pounds meat scraps or tankage.

C. Shelled corn in self-feeder.
   Skim milk twice daily in troughs.

The meat scraps or tankage in feed mixtures A and B may be changed to 5 pounds meat scraps and 5 pounds of soybean oilmeal. The ground wheat may be replaced with equal amounts of flour middlings. Shelled corn may be fed in addition to either pig starters A or B. Self-feed pig starter till pigs weigh 70 pounds or more. Always use clean, palatable feeds; moldy feeds will not do.

To make a ton of pig starter A, 25 bushels of shelled corn, 6⅔ bushels of wheat and 200 pounds of tankage are required

The Self-Feeder Method Is Best

A feeder suitable for young pigs keeps feeds cleaner, helps to prevent robbing, gives pigs of various sizes an equal chance, gains are made faster and more economical and pigs remain healthier than is common by trough feeding. Always keep feeder supplied with feed and in good working order. The above pig starters, self-fed, are recommended till pigs weigh 70 pounds or more. Provide one foot of self-feeder space for each eight pigs.

An Abundance of Water Is Essential

Pigs require approximately five pounds of water for each pound of gain. During the summer full grain-fed shoats will require about one gallon or more of water daily. Plenty of good drinking water is just as essential for gains as grain feed. Water is best when provided by automatic fountains, springs or safe fresh water streams. Always have plenty of watering space to avoid overcrowding.

When Grain Is Limited

When it is desired not to full-grain-feed spring pigs on good legume pasture, no less than one and one-half to two pounds of corn should be fed daily for each 100 pounds of live weight. Feeding less than these amounts may cause unthriftiness. When the pasture is not plentiful, more grain should be fed daily. Limited grain-fed pigs will require about three times as much acreage of pasture as similar pigs on full grain feed. Late spring pigs may be limited in grain on pasture when they are wanted to hog-off corn in the fall or follow feeding cattle.

Grinding or Soaking Corn

When ear corn is very hard in the spring or summer and the pigs will not eat enough, shelled corn should be tried. It may be necessary to coarsely grind very hard corn but when corn is not too hard, grinding usually does not pay for the extra expense. Corn may be soaked for about twelve hours to soften it. This improves palatability but it is not considered practical for large herds. As a general practice, grinding or soaking corn is not economical for pasture feeding.

When Hot Weather Comes

Perhaps no animal suffers as much from excessive summer heat as the hog. This retards feed consumption and slows up gains which is often costly. In feeding for market, practical feeding trials generally show that pigs gaining the most rapidly require less feed to produce 100 pounds of gain than those gaining at a slower rate.

From seven to eight square feet should be provided for each feeding shoat in the shade. A herd of 75 head would require a shade of 20 feet by 30 feet or 600 square feet. Dense tree shade is the most comfortable but when no trees are available, shade can be made by setting posts in the ground six to eight feet apart in the form of a square, then fasten joists about four feet above the ground to support boards and straw, cornstalks, brush, or other materials to make shade.

Feed, Water and Shade

Feed, water and shade for pigs must be close together during the summer months to keep market pigs gaining rapidly. From 25 to 30 feet apart is a good distance. The feed and drinking water should be in the shade if possible. When these are more than 100 feet from the shade, the pigs generally will not eat or drink enough on hot days.

> This is offered for the purpose of giving farmers who raise spring pigs for market, information on the most successful practices of management, uses of feeds, and methods of feeding pigs from weaning to market weights. It is a summary of many hundreds of farm experiences and experimental feeding trials.

Leaflet No. 208 Leaflet No. 214 By J. W. SCHWAB *Division of Animal Husbandry*

FEEDING SPRING PIGS ON PASTURE

Success Starts in the Nursing Period

Numerous experiences have shown that young pigs beginning life in clean, comfortable quarters on ground free from disease and parasite infection, receiving an abundance of mother's milk and given a suitable pig starting feed when two to three weeks old, grow rapidly and economically. Pigs weaned at eight to nine weeks old should be vigorous, in excellent health, and weigh from 30 to 40 pounds or more.

A Practical Pig Starter

A starting feed which has proven very successful with farmers over Indiana, is a mixture of 70 pounds ground corn, 20 pounds ground wheat and 10 pounds meat and bone scraps or tankage. The corn and wheat should be ground from medium to coarse, and all feeds must be of good quality for starting pigs when they are two to three weeks old. Wheat middlings may be used when wheat is not available. Skim milk or buttermilk may be fed in troughs, mornings and evenings, in place of the tankage. The pig starter, or any other practical feed for young pigs, should be full-fed in suitable self-feeders until the pigs weigh 70 pounds or more. An automatic fountain of water should be kept close to the self-feeder.

Feeds for Pigs on Pasture

Alfalfa, red or alsike clover, or mixtures of these legumes with some timothy, produce successful pastures for hogs. Good legume pastures produce vigor and health and save 10 to 20 per cent of the grain in hog feeding. The gains, too, are slightly faster than is obtained in drylot feeding. The following feeds in many feeding trials were found to be most practical; all feeds are recommended self-fed, free-choice:

A. Shelled corn, tankage or meat and bone scraps.

B. Shelled corn and mixed supplement of 20 pounds meat scraps or tankage, 20 pounds fishmeal, 40 pounds soybean oilmeal, 10 pounds cottonseed meal and 10 pounds linseed oilmeal.

C. For growing and fattening pigs, wheat, when not more than eight to ten cents higher per bushel than corn, may substitute as much as one-half or more of the shelled corn. Wheat should be fed coarse-ground.

D. Ear corn may be fed on the ground and tankage or the mixed supplement in troughs at the rate of one-half to two-thirds pound per head daily, or soybean oilmeal, two-thirds pound per head daily.

E. Shelled corn alone, self-fed, or ear corn on the ground may be fed on alfalfa or red clover pasture, but many experimental feeding trials compared with corn and tankage show that corn alone on pasture, required more feed for 100 pounds gain and three to four weeks longer to finish the hogs to comparable weights. This loss of time is very important when prices are declining in the fall.

Minerals for Pigs

Ten pounds pulverized limestone, 10 pounds steamed bone meal and 1 pound salt make a good mineral mixture. Feed minerals and extra salt in self-feeder. Do not mix minerals with grain.

What Is Pasture Worth Per Acre?

Average of four feeding trials at the Purdue Experimental Swine Farm:

(40 pigs in each lot)	Dry Lot	Pasture
Average weight at start	70 lbs.	70 lbs.
Average weight at finish	217.6 lbs.	217.7 lbs.
Days on feed	91.5	85
Feed for 100 pounds gain:		
Shelled corn	347 lbs.	330 lbs.
Tankage (60% protein)	34.1 lbs.	24.3 lbs.

To gain from 70 pounds to 217 pounds, each pig on alfalfa pasture required 23.7 pounds less corn, 14.3 pounds less tankage, and finished three and one-half days earlier than the pigs self-fed in drylot. With twenty pigs per acre the pasture saved 474 pounds of corn and 286 pounds of tankage.

227.3

HOW TO GROW THRIFTY FALL PIGS

Essentials in Raising Fall Pigs

Fall pigs should be farrowed early; August 15th to September 20 is the most favorable period. Pigs farrowed later are generally not large enough to thrive when winter starts.

Breeding animals should be fully developed, deep in body, well proportioned and active as large vigorous pigs are required for successful fall pig production.

Liberal feeding of practical rations for suckling sows and pigs are necessary to maintain good health and to produce economical gains. It requires approximately 15 bushels of corn and 85 pounds of tankage for each fall pig from weaning (eight weeks old) to 225 pounds.

Housing equipment should be roomy and easily made comfortable for pigs in all kinds of weather.

Every precaution in management is necessary to avoid parasites and other common pig troubles. Unthrifty pigs are a liability.

The Farrowing Quarters

The most practical farrowing quarters are individual houses which may easily be moved in advance of farrowing, to pastures away from the danger of parasite and disease germ infection. Old hog-lots are not safe for young pigs. Farrowing quarters should be well cleaned in advance and made very comfortable. Generally, very little or no bedding is needed in warm weather.

Often when sows have their choice, they will farrow out in fields in thickets of trees. In this event draw an individual house close to sow and litter for protection from rainstorms. Always keep sows contented and away from other animals at farrowing time. Farrowing quarters should be protected from flies. Burlap for doors and windows is suggested.

Feeding Sows at Farrowing Time

Feed the regular ration until the time of farrowing. The day a sow farrows she cares for little or no grain, but should have plenty of fresh drinking water. Equal parts of ground oats and wheat bran or bran alone, fed dry, no slop, is an excellent feed for two to four days—then start to add a little corn and other grains. Increase the amount as the pigs increase their demand for milk.

The following feeds have proven very practical:

1 bushel shelled corn
1 bushel whole oats
10 pounds high-grade meat scraps or tankage.

These feeds may be coarsely ground and fed mixed if desired.
Twenty to 25 pounds of coarse-ground wheat or middlings may be fed when good oats are not available. When wheat is fed, also coarse-grind the corn, and mix feeds. When the young pigs begin to want grain, feed sows liberally. Keep sows and litters on pasture as late in the fall as plenty of alfalfa or clover is available.

Whole or coarse-ground oats and tankage, fed free-choice in self-feeders, is highly recommended for suckling sows. In addition feed all the shelled or ear corn they will clean up mornings and evenings. Have a constant supply of water close to the place of feeding; this is very important.

Minerals for Sows

Ten pounds of pulverized limestone, 10 pounds of steamed bone meal and 1 pound of salt make a good mineral mixture. Have a constant supply of these minerals and extra barrel salt in a self-feeder for this purpose. Do not mix minerals or salt with grain.

Feeding Young Pigs

Start feeding pigs a balanced ration when two weeks old as the growth of fall pigs must not be retarded. Always use palatable feeds of good quality. The following feed mixtures make excellent pig starters:

A. 70 pounds coarse-ground shelled corn
20 pounds coarse-ground wheat
10 pounds high-grade meat scraps or tankage.

B. 45 pounds coarse-ground corn
45 pounds coarse-ground wheat
10 pounds meat scraps

C. 90 pounds coarse-ground corn
5 pounds meat scraps
5 pounds soybean oil meal

Five pounds of meat scraps and 5 pounds soybean oil meal may be used instead of the 10 pounds of meat scraps in A or B. Twenty pounds of flour middlings may be used to replace the wheat in A. Shelled corn may be self-fed in addition to either pig starter. Skim milk, fed mornings and evenings, may replace the meat scraps or tankage. Soybeans are not recommended for young pigs. Occasionally, pigs scour from over-eating at the start. In this event feed limited amounts for two or three days, then increase gradually to full feed. Always have a fountain of drinking water close to the place of feeding grain. To make a ton of pig starter A, it requires 25 bushels of shelled corn, 6⅔ bushels of wheat and 200 pounds of meat scraps or tankage.

The Self-Feeder for Pigs is Practical

A suitable self-feeder for young pigs helps to prevent robbing, gains are made faster and more economically, pigs remain healthier and feeds are kept cleaner than is possible with trough feeding. Always keep feeder supplied with feed and in good working order. Self-feed the above pig starters until fall pigs weigh 75 pounds or more. One foot of feeder space is needed for each six to eight young pigs. Before pigs are weaned, locate feeders in a creep or make a pig diner so feeds will be kept dry.

Winter Feeding Fall Pigs

When pigs have finished with a pig starter, ear corn may be fed on clean floors, but shelled corn fed in self-feeders is much preferred. When corn and wheat are fed, coarse-grind both and feed mixed. One-third of the feed mixture may be ground oats of good quality.

Protein Supplements

In addition to corn or corn and other grains, a practical protein supplement is recommended.

20 pounds of meat and bone scraps
20 pounds of fishmeal
40 pounds of soybean oilmeal
10 pounds of cottonseed meal
10 pounds of alfalfa meal

This feed mixture is "Purdue Supplement 5" which has produced gains at lowest cost when fed free-choice with shelled corn in four feeding trials at the Purdue University experimental swine farm.

When fishmeal is not available, the following mixture is recommended:

40 pounds meat and bone scraps
50 pounds soybean oilmeal
10 pounds alfalfa meal

Meat and bone scraps or tankage is also a practical supplement.

Sleeping Quarters

As soon as cool nights come in the fall, sleeping quarters must be dry, well bedded and free from drafts. The east, west and north sides of barns, sheds or houses must be tight. Damp, drafty or uncomfortable sleeping places are favorable for the development of pig flu or pneumonia which is common in the fall. Wheat straw and corn fodder are good for winter bedding. Comfortable sleeping quarters help to save the feed.

The Intestinal Round Worm

Post-morten examinations of several hundred unthrifty fall pigs from the farms of Indiana, have revealed that approximately 90 per cent were infested with intestinal parasites. A heavy infestation of the intestinal round worms and short rations will cause fall pigs to become unthrifty. Therefore, it is very important to have sows farrow out in pastures or fields, away from old hog-lots, where young pigs are protected from serious infestation. It is not advisable to move young pigs from pastures to barnyards until they have reached 70 pounds or more. Full feeding of balanced rations will also enable pigs to resist these common parasites.

Pig Notes

Check pig scours at first indications. Give sow an ounce of baking soda (bicarbonate of soda) daily in water for two or three days.

Feed sows sparingly for the first two to four days after farrowing to avoid milk fever. Wheat bran fed dry is good.

Sow's milk is more than 80 per cent water; a constant supply of drinking water is essential.

Treat pigs kindly so they will be easy to handle.

Keep pigs out of old hog lots; they get wormy there.

Feeding grains dry, no slop, helps to prevent digestive disorders in sows and pigs.

When early spring pigs cannot exercise on sod ground when a week old, place a chunk of sod about the size of a spade in the pen daily to help prevent anemia.

Wean pigs from 8 to 9 weeks old.

Skim milk and buttermilk are excellent tonics.

When pig tusks are long and sharp, cut off points.

Castrate pigs when four to five weeks old.

A study was made of 7564 pigs at the Purdue University Experimental Farm. It was found that pigs weighing 3 pounds at birth weighed 6½ pounds more when eight weeks old than those weighing 2 pounds.

To prevent hog cholera vaccinate young pigs two weeks before weaning or ten days to two weeks after weaning.

When sleeping quarters get dusty, clean out all litter, sprinkle with water and then spray with crude oil or crank-case oil.

In Indiana it is practical to full grain-feed spring pigs for market from start to finish to take advantage of higher market prices generally prevailing in August and September.

Good market weights are from 200 to 220 pounds. At these weights spring pigs should be finished to produce carcasses with 1½ to 2 inches of back fat.

Fall pigs farrowed after September 20 are generally not large enough to thrive when cold weather comes.

Pigs farrowed early in the fall can be finished for market at 200 to 220 pounds and more, late in February, March and April. This period is generally advantageous for marketing fall pigs in Indiana as market receipts usually decline and prices rise.

At the Purdue Experimental Swine Farm, one acre of alfalfa pasture successfully carried 20 shoats self-fed shelled corn and tankage. Twenty shoats, fed one-half grain ration (2 pounds of grain daily per 100 pounds live weight), required approximately three acres of pasture.

Self-feeding grain to pigs on pasture saves time and labor and produces economical gains.

Before buying a large amount of tankage, first try a 100 pound bag. If it is dry, palatable to the pigs, and otherwise satisfactory then buy more.

Anemia of Suckling Pigs

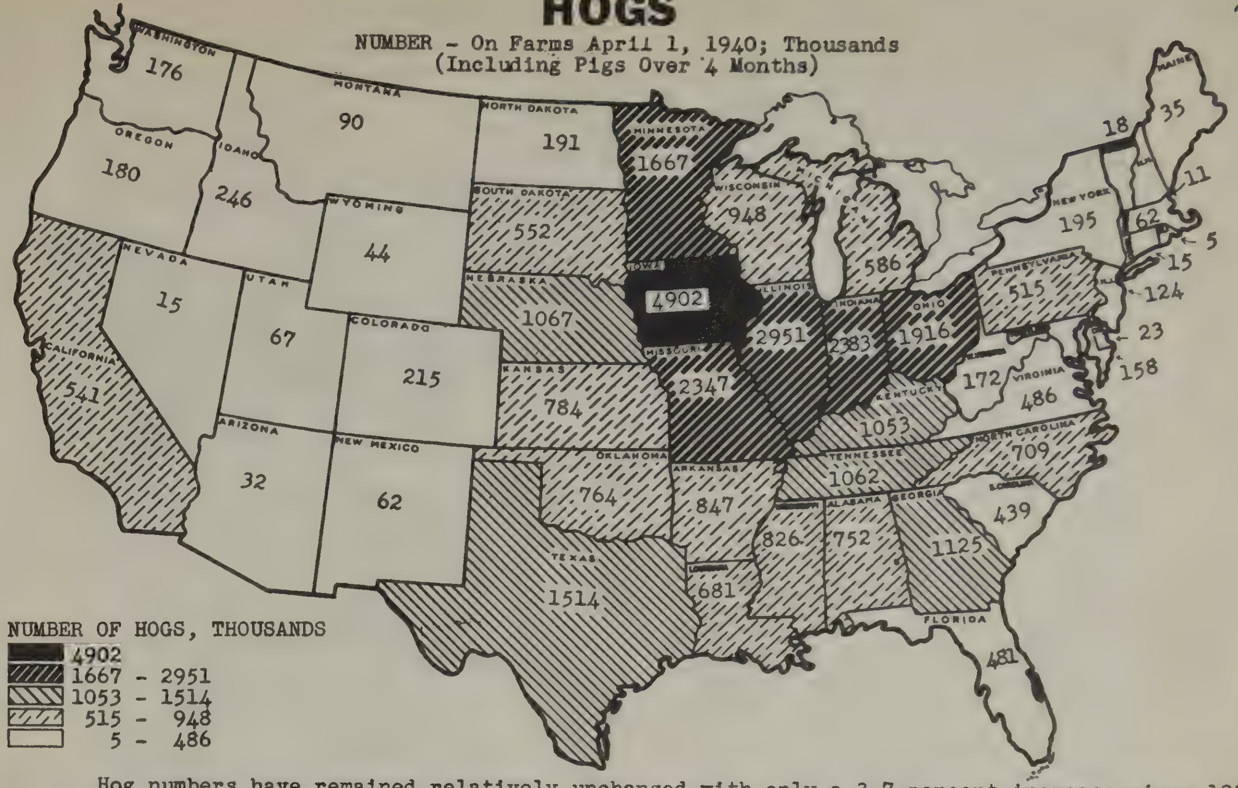
Anemia is a peculiar disease which is common in Indiana with pigs farrowed in the winter or early spring when cold weather often prevents them from getting out on soil or sod ground. Anemic pigs usually have poor appetites, are weak, and, in advanced cases, have labored breathing, commonly called "thumps". The loss of anemic pigs is usually heavy at from three to six weeks of age.

Purdue University
Leaflet No. 210
(Revised)

By J. W. SCHWAB
Division of Animal Husbandry

HOGS

NUMBER - On Farms April 1, 1940; Thousands
(Including Pigs Over 4 Months)

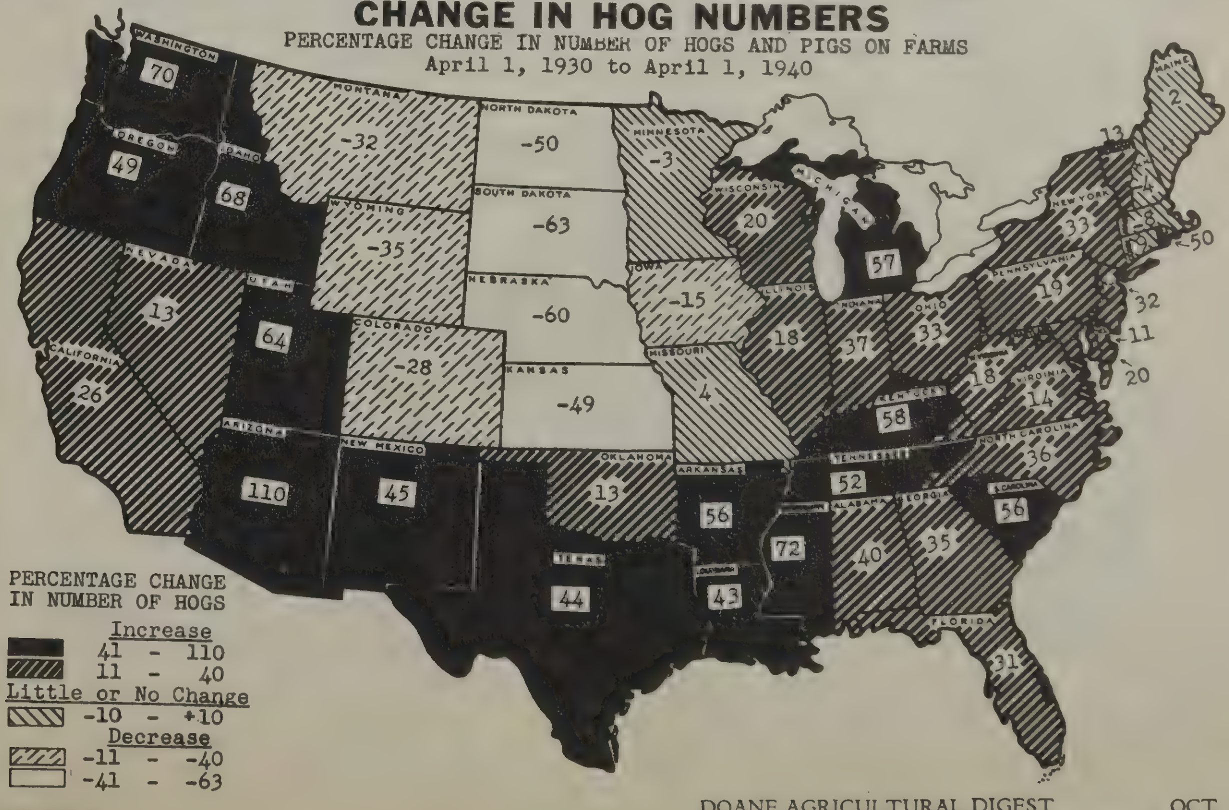


Hog numbers have remained relatively unchanged with only a 3.7 percent increase since 1930. Large hog numbers are definitely associated with the agricultural resources of the nation. Iowa and other Corn Belt States are the leading centers of production, but hogs are raised in every state and have always been a principal source of meat. They are not native of this country but were introduced by early Spanish explorers.

Regional changes are dominated by sharply reduced numbers in the drought belt and adjoining areas. Most other regions have shown a rapid increase in numbers.

CHANGE IN HOG NUMBERS

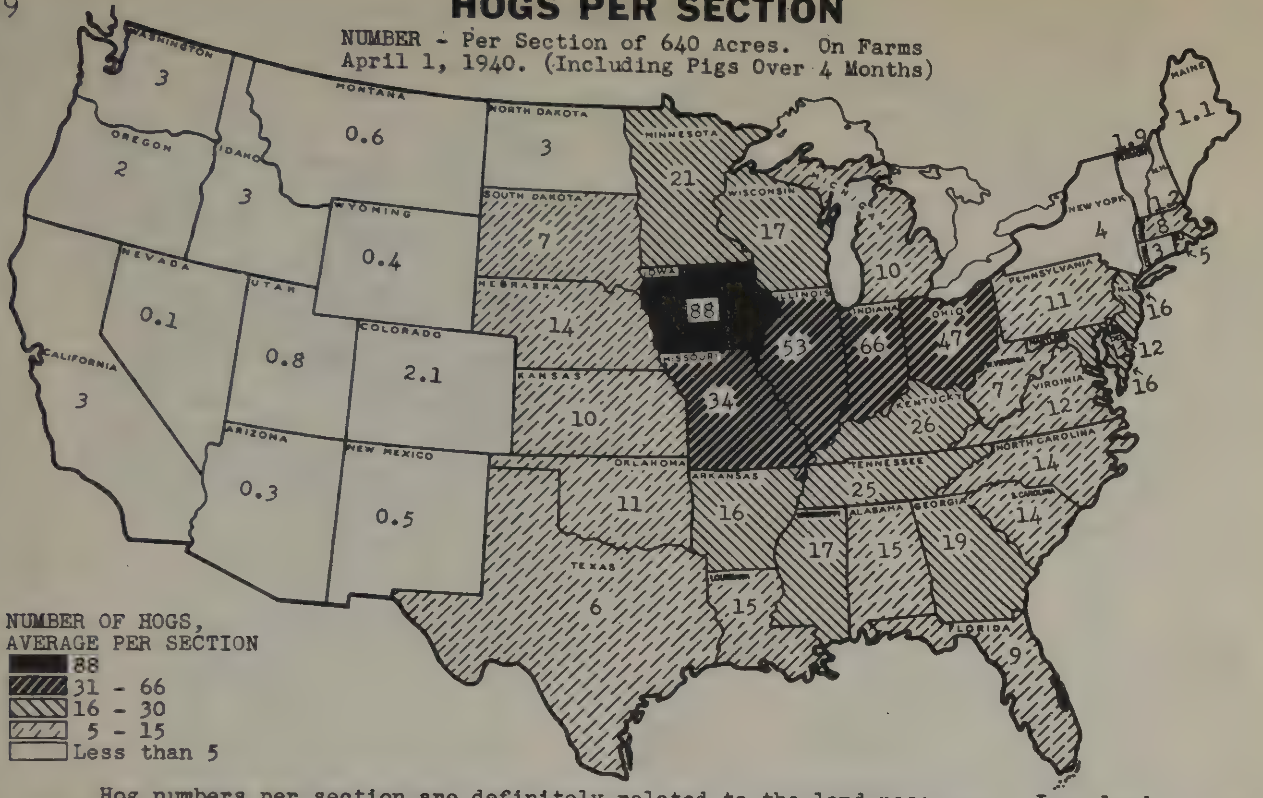
PERCENTAGE CHANGE IN NUMBER OF HOGS AND PIGS ON FARMS
April 1, 1930 to April 1, 1940



Based on Census Data

HOGS PER SECTION

NUMBER - Per Section of 640 Acres. On Farms
April 1, 1940. (Including Pigs Over 4 Months)

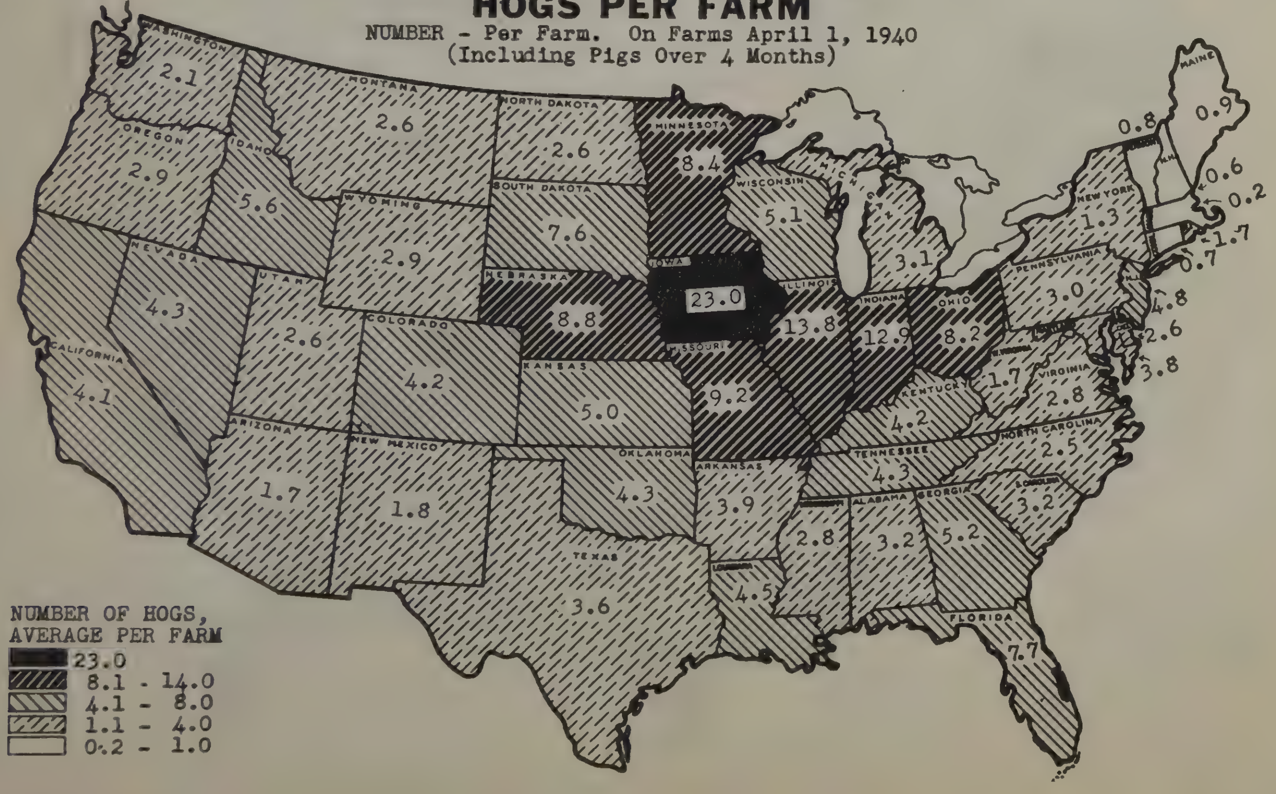


Hog numbers per section are definitely related to the land resources. Iowa leads with 88 per section. Outside of the Corn Belt, the East South Central and South Atlantic States are the principal centers of production.

The number per farm is also definitely related to the agricultural resources of a region and to the size of the farm unit. Iowa leads again with an average of 23 hogs per farm. Outside of the Corn Belt, hog numbers per farm are relatively small. Some areas produce feeder pigs that are finished for market in the corn-producing states.

HOGS PER FARM

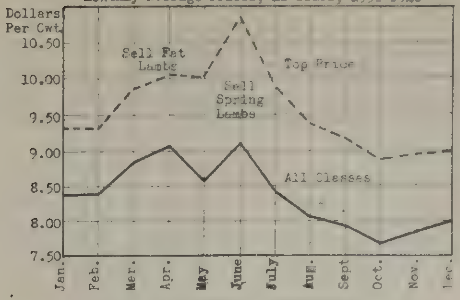
NUMBER - Per Farm. On Farms April 1, 1940
(Including Pigs Over 4 Months)



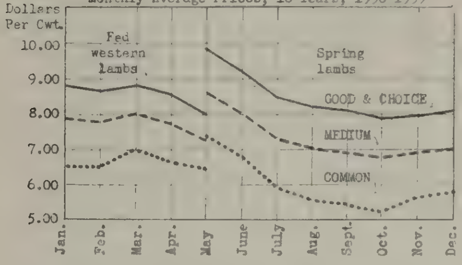
Based on Census Data

SHEEP - WHEN TO SELL AND BUY

FAT LAMBS - CHICAGO
Monthly Average Prices, 10-Years, 1931-1940



FAT LAMBS - INDIANAPOLIS
Monthly Average Prices, 10-Years, 1930-1939 *



Late April and May price quotations for fed western lambs are on a shorn basis. This is largely responsible for the down trend in prices from March to May.

No class of livestock is more dependent on careful handling to produce profits than are sheep enterprises. Exact timing of breeding, buying and selling often accounts for the difference between profits and losses.

WHEN TO SELL YOUNG FAT LAMBS

Sell young fat lambs as soon as they can be brought to market weight and finish. In 17 of the last 20 years July prices at Chicago have averaged lower than June prices. Only 3 times have prices been higher in July.

To insure lambs of proper weight and finish for the June or earlier market it is very important to follow a definite breeding program; have lambs come in February or early March and creep fed. Satisfactory early lambs can be produced by crossing good purebred rams of the Southdown, Shropshire and Hampshire breeds on native or western ewes.

Be sure lambs are fat and heavy enough to sell----70 pounds or more.

WHEN TO BUY FEEDER LAMBS AND SELL AGED FAT LAMBS

It is necessary to consider both buying and selling when planning a lamb feeding program.

In general there are two successful methods of handling feeder lambs:-

I. Pasture System

Under this system feeder lambs are purchased early (July to Sept.) at weights of 45 to 55 pounds. They are then placed on good pasture. (See page 220) It is important to have enough pasture available to carry the lambs to market weight and finish as it seldom pays to shift to dry lot at the end of the pasture period. However, it is possible to supplement late pasture with some grain if conditions justify.

The success of this system depends on producing fat lambs at minimum cost. It is adapted to farms which have a large acreage of good clover, lespedeza, or mixed grass and legume pasture.

Advantages of the system

1. Pasture and other forage crops are used. Thus feed costs are held to a minimum.
2. Labor costs are held to a minimum.
3. Death losses can be held to a minimum.
4. No shelter is necessary - housing costs eliminated.

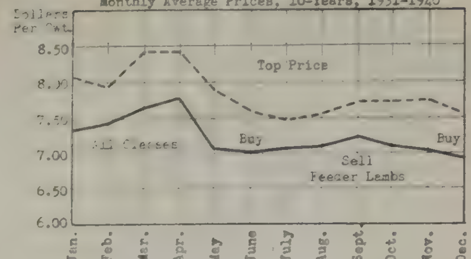
Disadvantages of the Pasture System

1. Price margin between buying and selling weights are usually small averaging less than $1.00 per hundred.
2. Parasites, especially stomach worms, require special measures and may at times limit gains.

II. Dry Lot System

Under this system feeders are purchased in the fall or winter at weights of about 60 pounds. They are then placed in dry lot on full feed of grains and legume hay. Late purchases (Nov. or Dec.) usually insure the widest price margins. (See page 220.)

FEEDER LAMBS - CHICAGO
Monthly Average Prices, 10-Years, 1931-1940



Feeder market in June and July is very irregular and there are not always enough lambs on sale to establish a market.

The feeding period is usually 90 to 120 days. Lambs should be marketed when they reach market weight and finish. Holding finished lambs is expensive. Plan program on the high spring markets so that lambs can be sold in March and April.

The success of this system depends on securing a satisfactory price margin between cost of feeders and sale price of fat lambs. This is the program most commonly followed on corn belt farms when there is an abundance of grain, good legume hay, and sufficient shelter.

Advantages of the system

1. Price margin between buying and selling weights are usually at a maximum. The average spread between feeders bought in December and fat lambs sold in April is over $2.00 per hundred.
2. Surplus grain and good hay can be successfully marketed. (Poor quality feeds cannot be used.)
3. Parasites are not a problem after the lambs have been wormed once.

Disadvantages of the Dry Lot System

1. Feed costs are high.
2. Labor costs are high.
3. Death loss from colds, pneumonia, etc. is high.
4. Housing costs are high. Five to seven square feet of floor space should be allowed per animal.

WARNING -- During and immediately following the First World War the spring peak was very erratic. For instance in the eight years (1915 to 1922) highest prices for fed lambs occurred three times in May, once in April, twice in March and twice in February. This indicates that in periods of severe economic adjustment the spring peak may be unpredictable. (See Digest page 5.) Such irregularities may again be expected in the post-war period.

Lamb feeding, especially dry lot feeding is a much more hazardous undertaking than the feeding of cattle. Great risk is incurred because--

1. Death loss is unpredictable and cannot always be prevented. Loss of 3 to 4 percent is normal but 8 to 10 percent loss is not uncommon.

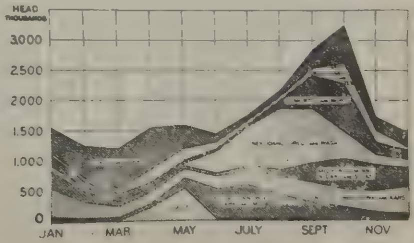
2. Daily rate of gain and gain per 100 pounds of feed fed may not be satisfactory.

3. Margins are uncertain-----prices tend to change as shown in the above graphs but the trends are not nearly as dependable as for hogs and cattle. Financial losses incurred in one year of drastic price decline like those of 1920 may erase the profits of many years of profitable operation.

WHEN TO SELL FEEDER LAMBS

Producers of feeder lambs normally have a very long marketing season. Slightly higher prices are usually received in September and early producers should take advantage of this especially if there is danger that their late pasture may not be adequate. From May to December average prices change only about 25 cents per hundred. Small lambs (45 pounds or less) are discounted after the end of August. Late marketing (after December) normally results in higher prices but costs are also increased.

In the final analysis the success of any sheep enterprise depends in no small degree upon the operator. Experience and good management are essential to success.



Origin of Market Receipts of Sheep and Lambs by Months *

THE SHEEP ENTERPRISE

Three general plans may be followed in sheep production: (1) Maintaining a flock of from 25 to 100 breeding ewes, purebred or grade, as part of the livestock on the average quarter-section or half-section farm; (2) specializing in sheep production as the major enterprise and maintaining all the sheep the farm will carry; (3) purchasing feeder sheep or lambs from the western range or the large market and fattening them.

SELECTION OF BREEDING EWES

Three methods of getting started with a farm flock are suggested:

1. Get ewes from flocks near home.
2. Purchase ewes at terminal markets through commission agents.
3. Buy directly or through dealers in the west.

Ewes with the following characteristics are recommended for purchase:

1. Two to four years old.
2. Sound, especially in udder and teats.
3. Well-grown, healthy and vigorous.
4. Evenly covered with a dense fleece of good length and quality.
5. A wide, deep body with straight lines and showing capacity for feed.
6. A good constitution as shown by a short neck, a deep wide chest and a full heart girth.
7. Showing good breed type if purebred.

SELECTING THE BREEDING RAM

The ram should be:

1. A purebred of pronounced breed type and characteristics.
2. Strong, vigorous, and massive with bold features.
3. From one to three years old (a ram may give good service until 7-8 years old).
4. Symmetrical and evenly developed.
5. Covered with firm flesh and a dense fleece.
6. Strong in the back, and with straight, strong legs.

A growthy ram lamb should not serve more than 15 ewes if he is to insure a uniform lamb crop and develop into a strong yearling. A yearling that is strong and well developed may serve 25 to 35, and a good two-year-old or aged ram, 50 to 60 ewes. Much depends upon the ram and the system of breeding. Owners of large flocks use 3 rams to 100 ewes.

FALL CARE OF FLOCKS

The ewes should be in good condition for breeding in the fall. After the lambs have been weaned, the ewes should be given good pasture to put them in a gaining condition. Treat for stomach worms.

If good results are expected from the lamb crop, the bred ewes must be handled carefully during the winter prior to lambing time. The flock should be treated for stomach worms again after the first hard freeze. They should be changed rather gradually from grass to dry feed. It is best to start feeding some hay before snow makes it absolutely necessary to do so. The winter ration should have as its foundation a leguminous hay such as clover, alfalfa, lespedeza, or soybeans, cut at the correct time. Bred ewes require a ration that furnishes protein, minerals, and vitamins. Ewes should gain slightly all through the period of pregnancy a total gain of from 10 to 20 pounds per head.

EWE AND LAMB AT LAMBING TIME

Three-fourths of all lambs lost before they reach the market die before they are 10 days old. Careful check on the following will cut your losses.

1. Feed grain sparingly at lambing time.
2. Provide clean, sunny quarters.
3. Cut the navel cord, leaving one-half inch stub and disinfect this with iodine or some specially prepared drying powder.
4. Give the flock attention day and night.
5. See that new-born lambs nurse and do not get chilled.
6. Treat lambs for disorders such as constipation, indigestion, and pinning.
7. Use individual lambing pens.
8. Tag wool away from around udder. It helps prevent wool balls in the stomach.

In general, two systems of lamb raising are followed. Early lambs are born during January, February, and early March. Late lambs are dropped in April and May, as a rule.

Early lambs bring the higher prices and are less troubled with internal parasites.

FEEDING YOUNG LAMBS

Early lambing ewes require better feed than those lambing late, and the lambs must be fed grain before going on pasture. Ewes lambing in April or May require little grain, and the lambs need little, if any, grain if they have an abundance of the best pasture and are kept free of parasites.

After the lambs learn to eat grain the best plan in most cases is to feed them twice daily what they will clean up in about fifteen minutes. Lambs two months old will eat from ½ to ¾ pounds of grain daily.

Equal amounts of corn and oats can be used with good results. After the lambs are two months old the grain need not be ground.

The reasons for feeding grain to suckling lambs are as follows:

1. The finish or fatness of the lambs can be materially increased by feeding grain.
2. On the average, lambs will be ready for market at a younger age when prices are higher.
3. The most economical gains are made with grain while the lamb is getting its mother's milk.
4. The shrinkage will be less in shipping.
5. The number of culls can be greatly reduced.

PURCHASING FEEDER LAMBS

There is more to purchasing feeder lambs than merely getting enough to make a car or a truck load. *Health, constitution, weight, quality, condition, form, fleece, breeding,* and *previous handling* are all to be considered. *Uniformity* is also important.

The margin, or spread, between the price per hundred at which lambs are bought and the price at which they are sold is generally the most important single factor in determining profit.

Original cost of feeder lambs generally represents 50 to 70 percent of the total cost of lamb feeding.

The cost of feed constitutes 20 to 40 percent of the total cost of the feeding enterprise.

FEEDING LAMBS IN FIELDS

Field-feeding provides use for otherwise unmarketable roughage and reduces feed and labor costs. Often soybeans or other similar crops are planted with corn to give the lambs a larger supply of feed. A pound of gain in five or six days is probably the average to be expected on grass pasture alone. Lambs on mixed grass and legume pastures or legumes alone, especially lespedeza · · · · · · · · make gains about equal to those made in drylot. By supplementing the pasture with grain feeding, the rate of gain may be increased 50 to almost 100 percent.

DRYLOT FEEDING

When lambs are on full feed about half the weight of the ration should, under most conditions, consist of dry roughage or an equivalent amount of silage or of feeds that are bulky in proportion to their weight.

The simplest satisfactory ration for fattening lambs in drylot consists of a concentrate and a legume roughage. Corn and legume hay may be expected to fatten 60-pound feeder lambs in a period of 90 to 110 days. Fed with good judgment, these two feeds make a ration sufficiently balanced in nutrients to put about a pound a head on good feeder lambs every 3 days. This may be considered a standard ration and a standard gain with which other rations may be compared.

A very satisfactory feeding schedule that makes use of corn and legume hay from the time the lambs arrive at the farm until they are marketed is shown below:

	Corn per lamb per day *lb.*	Legume hay per lamb per day *lb.*
First 5 to 7 days	0 — .25	1.75—2.0
2d week	.25— .50	1.75—2.0
3d week	.50— .75	1.50—1.75
4th week	.75—1.25	1.50—1.75
5th week to close	1.25—1.75	1.00—1.50

Shelled corn, legume hay, corn silage, and a protein supplement fed in these proportions make a suitable ration for fattening lambs:

	Average daily ration *lb.*
Shelled corn	1.1 to 1.4
Protein supplement	.15 to .20
Legume hay	.75 to 1.00
Corn silage	1.00 to 1.50

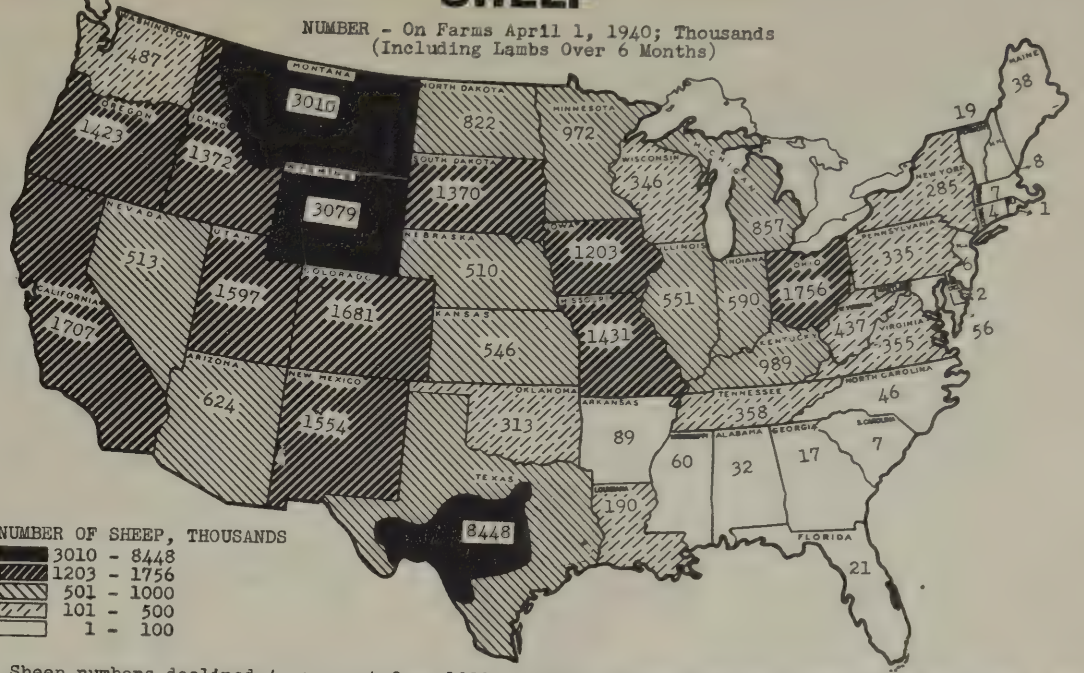
Deaths to the extent of 3 or 4 percent of the number purchased are considered normal. Many feeders, however, have lower losses and others occasionally lose 8 to 10 per cent or even more.

Each one percent of death loss may cut down returns 2 to 4 percent or even more.

Ill. Circular 523, 415;- Minn. Bulletin 141
Mo. Circular 333;- Michigan Club Bulletin 38

SHEEP

NUMBER - On Farms April 1, 1940; Thousands
(Including Lambs Over 6 Months)



Sheep numbers declined 4 per cent from 1930 to 1940. Texas leads all other states in total numbers, and produced 15 per cent of all lambs and 25 per cent of all western lambs in 1940. Montana and Wyoming also have large numbers. Ohio is the center of the eastern sheep area.

In the past decade substantial regional adjustments have occurred. From the Mississippi River west to the mountains, sheep numbers have been greatly increased with the largest percentage gain in Oklahoma with a 126 per cent increase. Largest total gain was in Texas where a 59 per cent increase occurred. All other regions showed a decline.

Sheep have been intimately identified with pioneering in America. From the start in New England the center of production has moved west to Colorado. Sheep adapt themselves to various climatic conditions and thrive on much of the arid land of the West.

Sheep production reached a peak in 1900 with 61,504,000 head. The United States total in 1940 was 40,129,261 head.

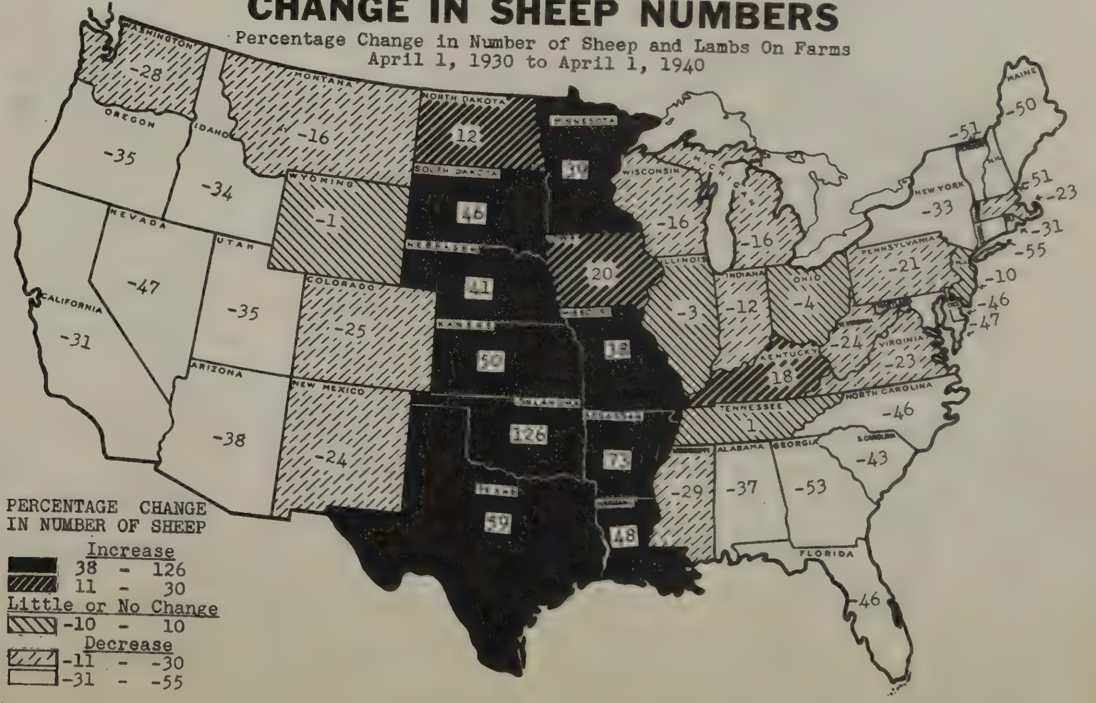
The leading wool producing states in 1940 in order of importance were:

	Pounds of Wool	Per Cent of Total U.S. Wool
Texas	80,352,000	20.7
Wyoming	33,271,000	8.6
Montana	29,946,000	7.7
California	27,280,000	7.0
Utah	20,581,000	5.3
U.S.	387,763,000	

These five states produce 49.3 per cent of the U.S. total or nearly one-half of all the U.S. wool.

CHANGE IN SHEEP NUMBERS

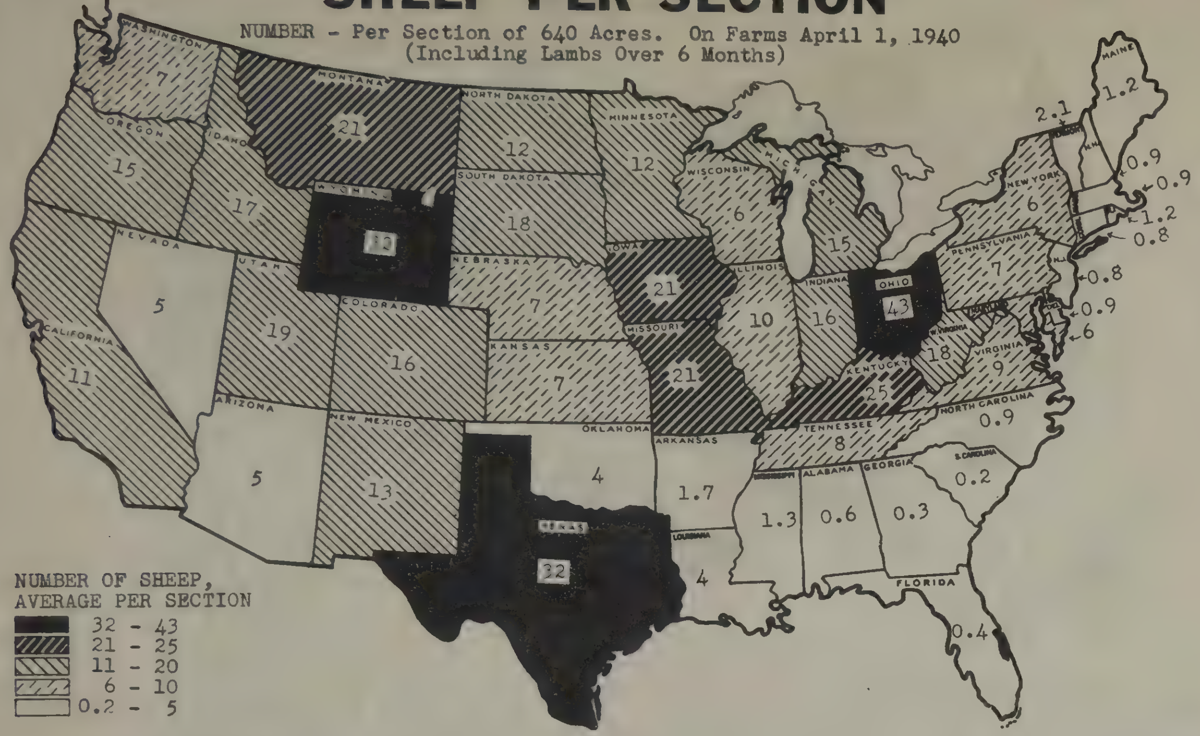
Percentage Change in Number of Sheep and Lambs On Farms
April 1, 1930 to April 1, 1940



Based on Census Data

SHEEP PER SECTION

NUMBER - Per Section of 640 Acres. On Farms April 1, 1940
(Including Lambs Over 6 Months)

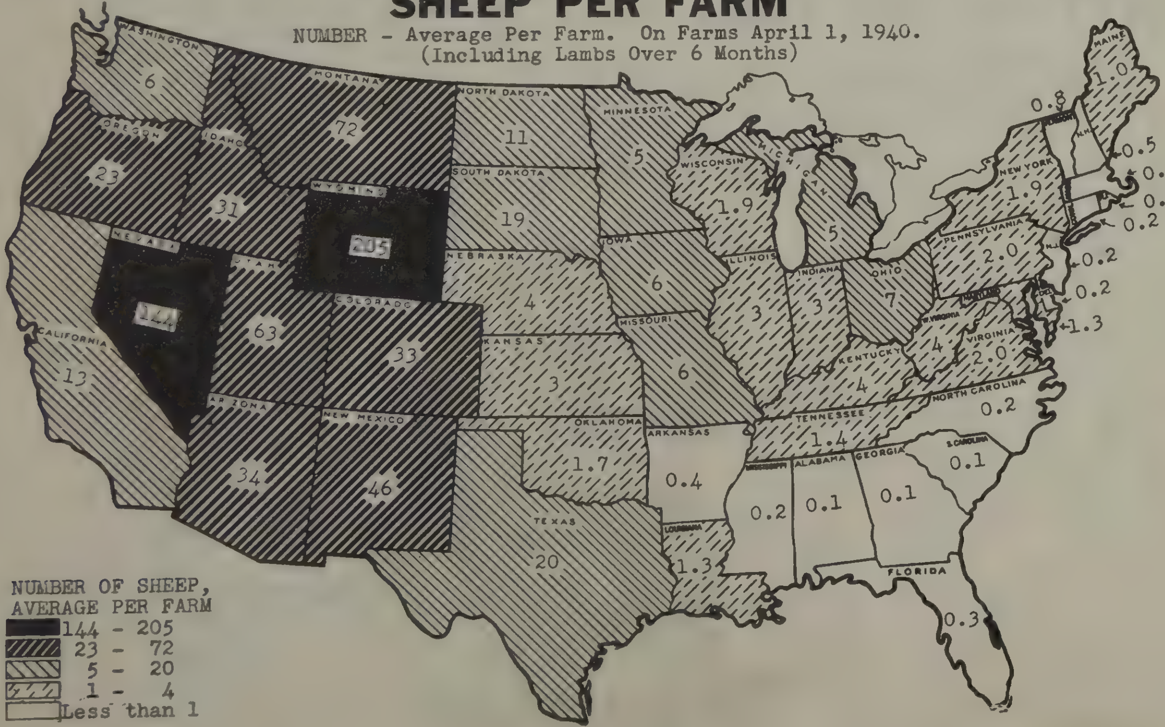


The concentration of sheep in relation to land area is greatest in Ohio. Texas and Wyoming are close seconds. Except for Ohio and adjoining areas, sheep numbers are associated with the Southwest and mountain-grazing regions.

The number of sheep per farm relates both to the type of farming practiced and the average size of farm unit. Wyoming with 205 sheep per farm leads all others. In the sheep section of Texas the number per farm is much higher than the state average of 20.

SHEEP PER FARM

NUMBER - Average Per Farm. On Farms April 1, 1940.
(Including Lambs Over 6 Months)



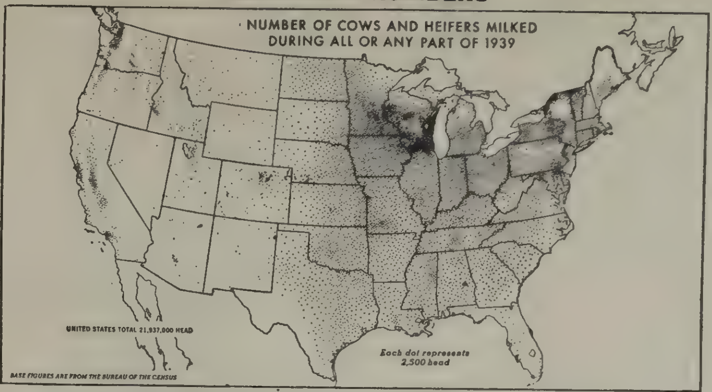
Based on Census Data

DOANE AGRICULTURAL DIGEST 1946

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

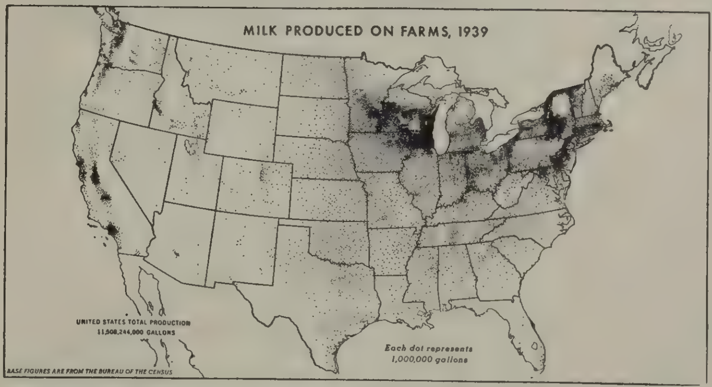
DAIRY FACTS

DAIRY COW NUMBERS


NUMBER OF COWS AND HEIFERS MILKED
DURING ALL OR ANY PART OF 1939
UNITED STATES TOTAL 21,937,000 HEAD
Each dot represents
2,500 head
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

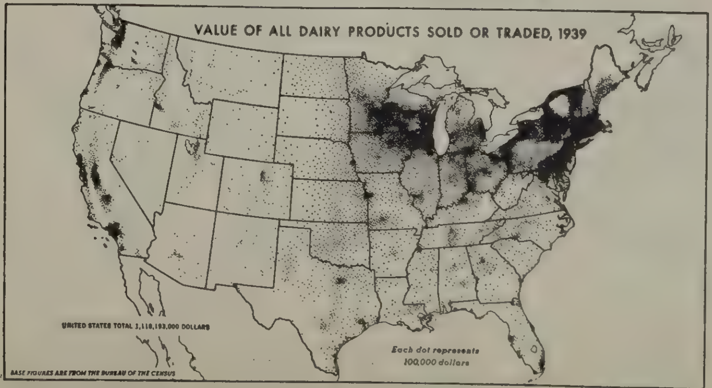
Nearly 90 percent of the dairy cattle in the United States are in the eastern half of the country, and 50 percent are in the Dairy Belt and the adjacent portion of the Corn Belt. The five leading States each had more than a million cows and heifers milked in 1939. Wisconsin had 2,024,000 head; Minnesota, 1,552,000; Iowa, 1,293,000; New York, 1,270,000; and Texas had 1,147,000 head. All other States had less than a million, with Nevada having the smallest number reported, about 17,000 head.

MILK PRODUCED


MILK PRODUCED ON FARMS, 1939
UNITED STATES TOTAL PRODUCTION
11,508,244,000 GALLONS
Each dot represents
1,000,000 gallons
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

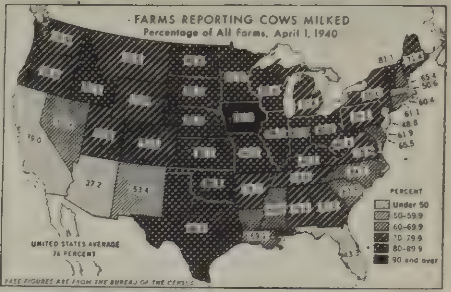
More than one-half the milk produced on farms in 1939 came from Minnesota, Iowa, the East North Central, and Middle Atlantic States. About one-fourth of the total milk produced comes from Wisconsin, Minnesota, and New York. Wisconsin produced 1,321,612,000 gallons, or 11.5 percent of the total; Minnesota had 866,590,000 gallons, or 7.5 percent; and New York 838,415,000 gallons, or 7.3 percent. The milk produced in the Pacific Coast region was 842,371,000 gallons which was only a little more than that produced in New York State.

VALUE OF DAIRY PRODUCTS


VALUE OF ALL DAIRY PRODUCTS SOLD OR TRADED, 1939
UNITED STATES TOTAL 1,118,193,000 DOLLARS
Each dot represents
100,000 dollars
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

The value of all dairy products sold or traded in 1939 was greatest throughout the Dairy Belt, in the industrial area between the Potomac River and Massachusetts. The States with the greatest value, in the order of amount were: Wisconsin, with $127,075,000; New York, $111,657,000; Minnesota, $72,838,000; and California with $67,128,000. These four States contributed about one-third of the total value of all dairy products sold in the United States. About 76 percent of the total value of dairy products sold in 1939 came from the sales of whole milk, about 22 percent from cream sold, and almost 2 percent from sales of farm butter. The data exclude the value of all dairy products on unclassified farms.

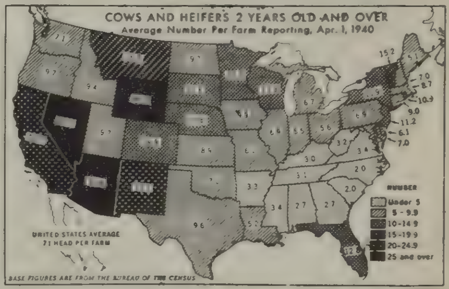
FARMS REPORTING COWS MILKED


FARMS REPORTING COWS MILKED
Percentage of All Farms, April 1, 1940
PERCENT
Under 50
50-59.9
60-69.9
70-79.9
80-89.9
90 and over
UNITED STATES AVERAGE
76 PERCENT
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS
19.0
37.2
53.4
69.1

BAE 42790

The percentage of all farms reporting cows milked on April 1, 1940, was about 3 percent more than on April 1, 1930. Many States showed changes of only 4 or 5 percent, but a few showed large increases. Texas had an increase from 68.5 to 80.9 percent; Oklahoma, 77.9 to 85.4; Arkansas, 59.8 to 74.2; Louisiana 50.9 to 69.1; Mississippi, 58.6 to 65.9; Alabama, 69.8 to 78.4; and Georgia 60.6 to 73.2 percent

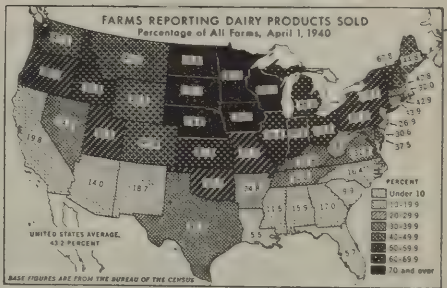
COWS AND HEIFERS


COWS AND HEIFERS 2 YEARS OLD AND OVER
Average Number Per Farm Reporting, Apr. 1, 1940
NUMBER
Under 5
5 - 9.9
10-14.9
15-19.9
20-24.9
25 and over
UNITED STATES AVERAGE
7.1 HEAD PER FARM
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS
9.6
5.2
3.4
2.7
2.7
12.8

BAE 42789

The average number of cows and heifers 2 years old and over per farm is closely related to the size of farms in the different regions. In the Southeastern States, 2 to 4 cows were reported per farm, except in Florida which had nearly 13 cows per farm kept mainly for beef production. The average for the Dairy Belt States ranges from 6 to 12, which are kept mainly for milk production. In the Corn Belt and in most of the Great Plains States, the cows reported per farm are under 10, whereas those reported per farm in the 11 Western States vary from 7 to 62 cows.

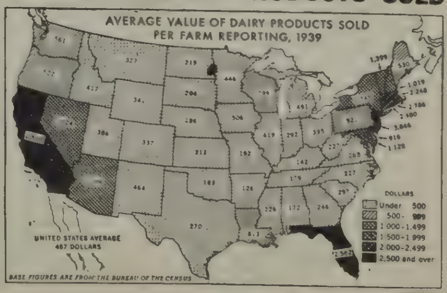
DAIRY PRODUCTS SOLD



BAE 42794

Reports show that more than 50 percent of all the farms selling dairy products on April 1, 1940, were located in the Dairy and Corn Belts and in winter wheat States. The average from the three dairy States, Wisconsin, Minnesota, and Iowa, was nearly twice the average of the United States. In three Western States, Idaho, Utah, and Oregon, more than 50 percent of all farms reported dairy products sold. However, the dairy farms in these States are fewer in number. Most of the eastern Cotton Belt States reported only a small percentage of farms as selling dairy products.

VALUE OF DAIRY PRODUCTS SOLD

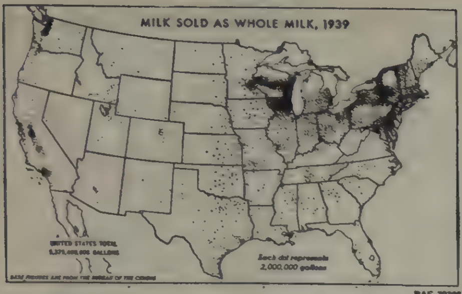


BAE 42793

In New Jersey, farms were reported with an average of $3,846 from the sale of dairy products, practically all of which was from whole milk. In California, farms were reported with $2,838, mostly from whole milk, some from cream, and very little from butter. Florida was fourth in the value of dairy products sold. This came from whole milk sold on a small number of large dairy farms.

DAIRY FACTS

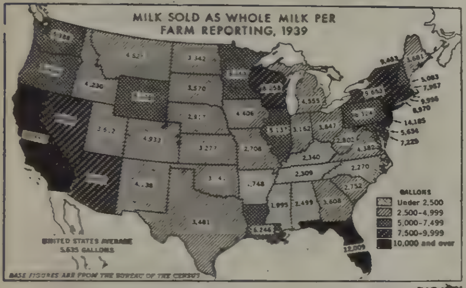
MILK SOLD


MILK SOLD AS WHOLE MILK, 1939
UNITED STATES TOTAL
Each dot represents 2,000,000 gallons
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 39366

Milk sold as whole milk was about 20 percent more in 1939 than in 1929. The sales are heaviest in the areas of heavy milk production which lie in the milksheds adjacent to, or surrounding the larger cities. Wisconsin furnishes milk to Chicago and several Wisconsin cities. New York City gets its milk from the New York milkshed which includes much of New York, parts of New England, New Jersey, and Pennsylvania. Washington, D. C., and Baltimore, Md., get their supply mainly from Maryland.

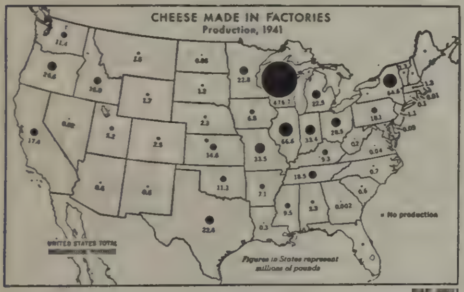
MILK SOLD PER FARM


MILK SOLD AS WHOLE MILK PER FARM REPORTING, 1939
GALLONS
Under 2,500
2,500-4,999
5,000-7,499
7,500-9,999
10,000 and over
UNITED STATES AVERAGE 5,635 GALLONS
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42791

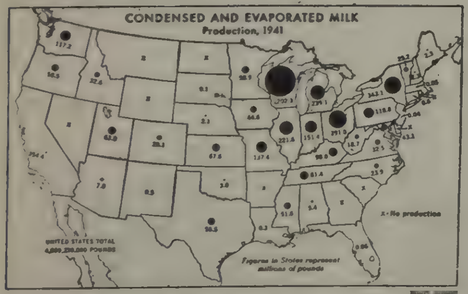
The actual volume of milk sold as whole milk per farm reporting only reflects the fact that dairy farms are few in number and large in size in such States as California, Nevada, Arizona, and Florida. The milk sold as whole milk per farm in Wisconsin, New York, and Vermont is less than in California, New Jersey, and Florida, but the total volume of the whole milk from these Dairy Belt States is much greater than in the latter States.

CHEESE



In 1941, the cheese made in factories in the United States totaled nearly a billion pounds, about half of which was made in Wisconsin. Illinois has moved into second place in the production of cheese, replacing New York in that item. The production of cheese almost doubled between 1929 and 1941.

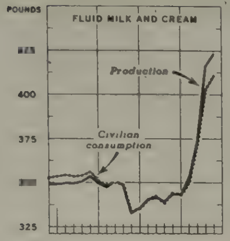
CONDENSED AND EVAPORATED MILK


CONDENSED AND EVAPORATED MILK
Production, 1941
x-No production
UNITED STATES TOTAL
Figures in States represent millions of pounds

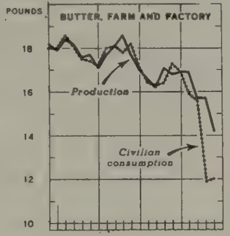
Production of condensed and evaporated milk in 1941 was centered in the Dairy and Corn Belts. About 30 percent of the total was produced in Wisconsin in 1941. The production of condensed and evaporated milk in California and Ohio each exceeded that of New York, which had the second largest production until recently. In the Southern States, South Carolina, Georgia, and Arkansas produced no condensed or evaporated milk, and there was no production in the semiarid States of the Northern Great Plains.

PER CAPITA PRODUCTION AND CONSUMPTION

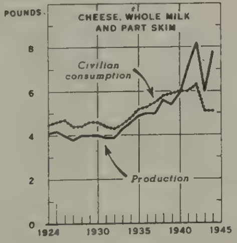
MILK AND CREAM



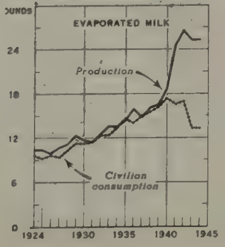
BUTTER



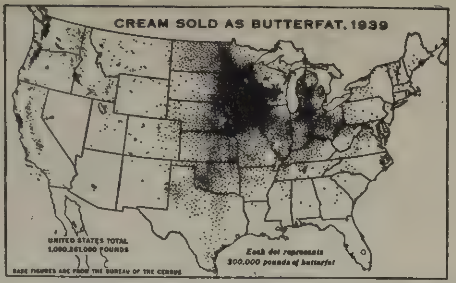
CHEESE



EVAPORATED MILK



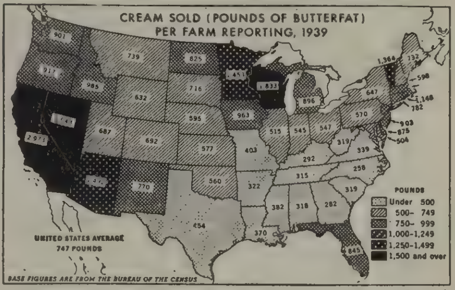
CREAM SOLD


CREAM SOLD AS BUTTERFAT, 1939
UNITED STATES TOTAL 1,090,261,000 POUNDS
Each dot represents 200,000 pounds of butterfat
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

AMS 547

About one-half of the entire quantity of cream sold as butterfat in the United States was sold in three States: Minnesota, 209,328,000 pounds; Iowa, 150,647,000 pounds; Wisconsin, 74,200,000 pounds. Some cream is sold as butterfat to factories in various districts of the South and in many irrigated valleys of the West.

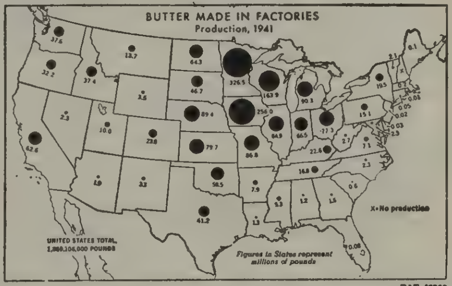
CREAM SOLD PER FARM


CREAM SOLD (POUNDS OF BUTTERFAT) PER FARM REPORTING, 1939
POUNDS
Under 500
500- 749
750- 999
1,000-1,249
1,250-1,499
1,500 and over
UNITED STATES AVERAGE 747 POUNDS
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42792

The three States having the greatest quantity of cream sold as butterfat in 1939 were: Minnesota, with 209,328,000 pounds; Iowa, with 150,647,000 pounds; and Wisconsin, with 74,200,000 pounds. In Wisconsin, about 40,500 farms reported selling cream as butterfat, whereas in Iowa about 156,500 farms so reported, which accounts for the great difference in the pounds of butterfat sold in cream per farm. North Carolina had the smallest number of pounds per farm of cream sold as butterfat with about 1,776,000 pounds from 6,900 farms. Nevada had next to the highest sales of cream sold in butterfat per farm, with about 1,857,000 pounds from 909 farms.

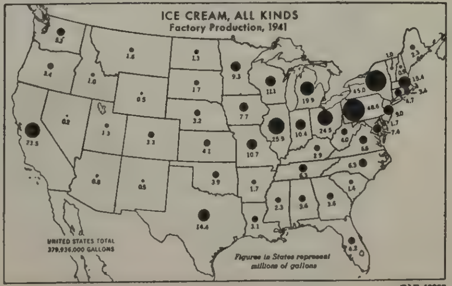
BUTTER



BAE 42800

In 1941, the factories making butter were located almost entirely in the Dairy and Corn Belts, in Oklahoma, Texas, and a few Western States. About 40 percent of the production of butter in factories was from Minnesota, Iowa, and Wisconsin, whereas the nine eastern Cotton Belt States, including Florida, furnished only about 2 percent and the New England States furnished practically none.

ICE CREAM


ICE CREAM, ALL KINDS
Factory Production, 1941
UNITED STATES TOTAL 379,936,000 GALLONS
Figures in States represent millions of gallons

BAE 42806

In 1941, most of the ice cream was produced in the northeastern quadrant of the country, and in Texas and California where there are large urban areas. Pennsylvania leads, and is followed by New York, Illinois, Ohio, California, Michigan, Massachusetts, and Texas. Production of ice cream increased more than 50 percent from 1936 to 1941. Some ice cream is produced in all States and the production per capita varies widely.

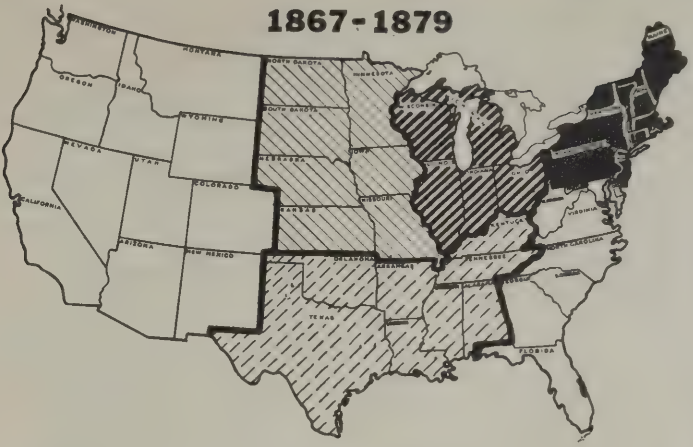
U. S. DEPT. OF AGRICULTURE

DOANE AGRICULTURAL DIGEST 1945
This material is based on factual information believed to be accurate but is not guaranteed (Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

REGIONAL CHANGES IN MILK PRODUCTION

1867 1945

1867-1879



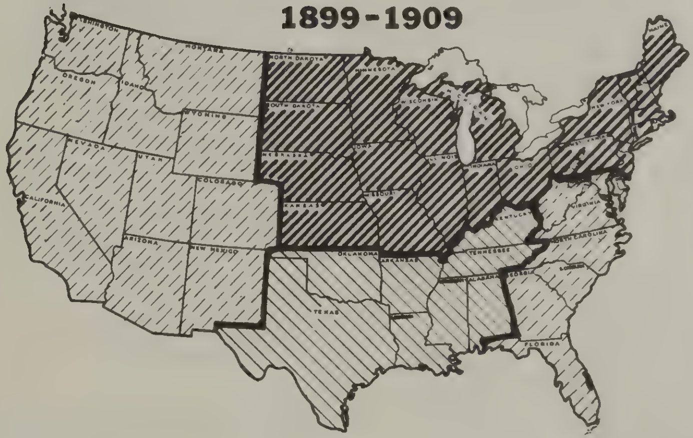
The accompanying maps on this page clearly illustrate the shifting of the dairy industry in the United States. The primary factor influencing this shift was the move toward the major feed producing areas. An important contributing factor was the establishment of population centers in the midwest and west.

There has been a steady increase in milk production on farms in the United States for the last thirty years, except for the momentary setbacks occurring during drouths of the thirties and the wartime expansion of poultry and hog production.

Production of milk increased in all regions, with the most pronounced gain taking place in the Pacific Southwest and the least in the Northeast. Milk production in the Lake States, Northeast, and the Corn Belt has remained fairly constant at about 62 per cent of the country's total milk supply, for almost 20 years.

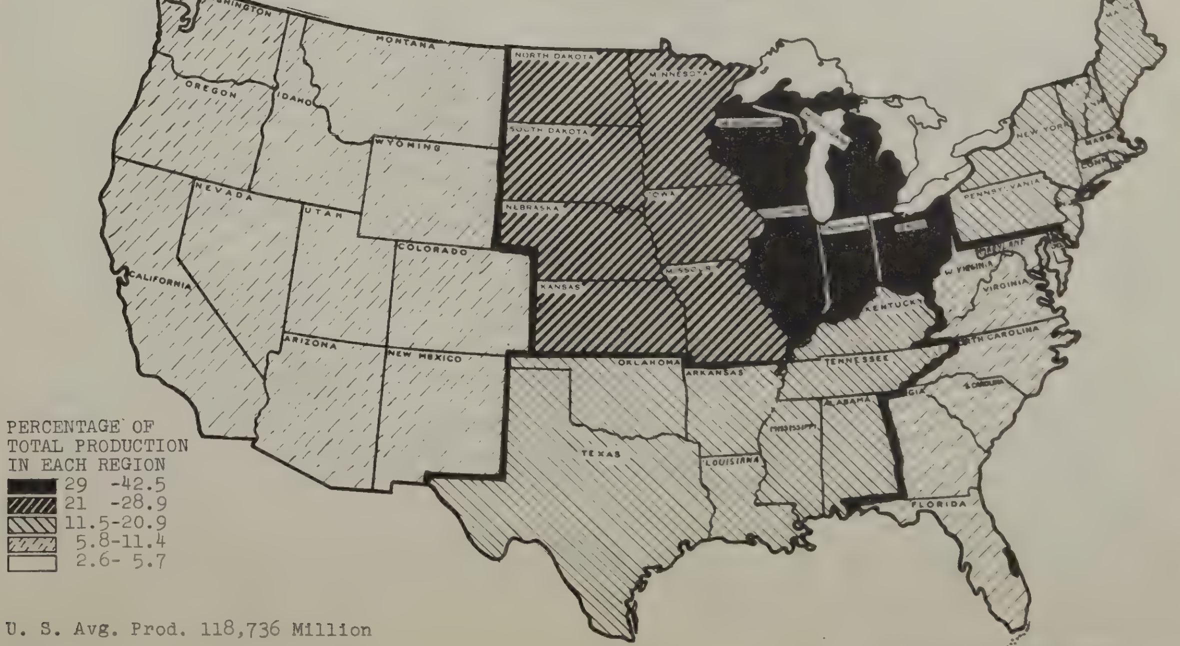
Production of milk on farms will continue to increase if dairying proves to be relatively profitable in relation to other farm enterprises. Another boost to future dairy production will result from continued improvement in efficiency of dairy cows, increasing quantities of feed supplies over the coming years, and further mechanization of the dairy industry.

1899-1909



Actual Per Cent of Total U. S. Production in each Region-1941-45	
North Atlantic	15%
East North Central	29%
West North Central	25%
South Atlantic	6%
South Central	14%
West	11%

1941-1945



U. S. Avg. Prod. 118,736 Million

Based on Data of U.S.D.A.

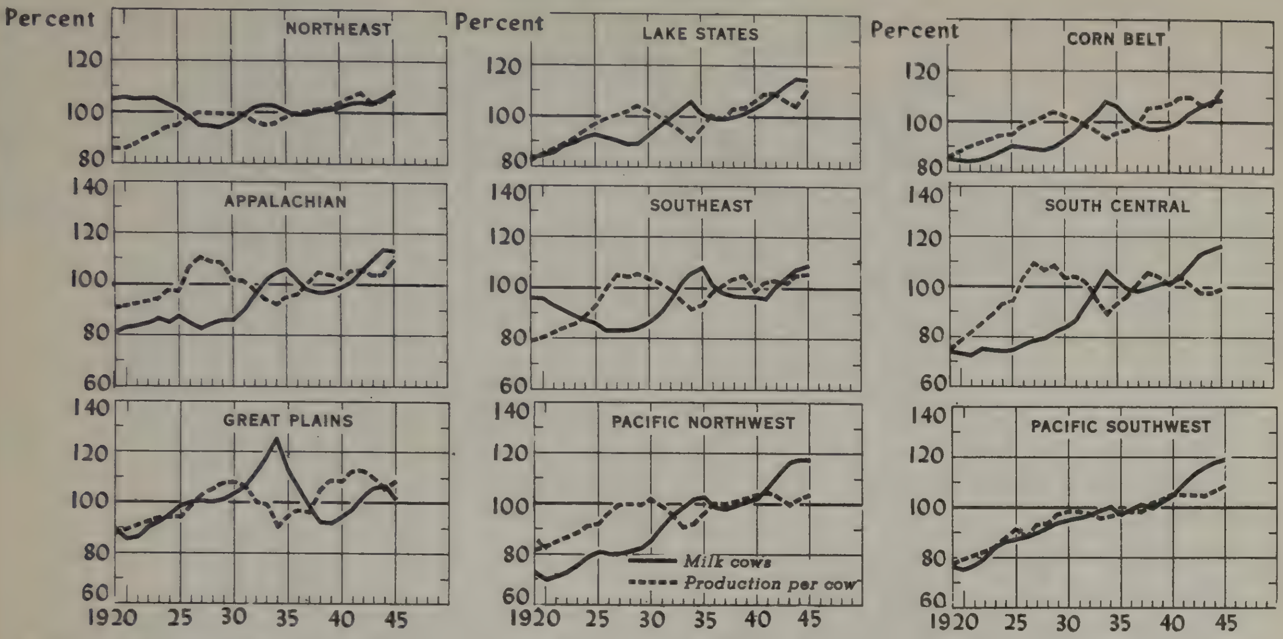
This material is [illegible] on factual information believed to be accurate but [illegible] Printed in U.S.A.

DOANE AGRICULTURAL SERVICE, Inc St. Louis 12, Mo

MILK COWS AND PRODUCTION BY REGIONS

MILK: AVERAGE NUMBER OF COWS AND PRODUCTION PER COW ON FARMS, - REGIONS, 1919-45

INDEX NUMBERS (1935-39=100)



Northeast Me., N. Hamp., Vt., Mass., R. I., Conn., N.Y., N. J., Pa., Del., Md., D. C.

Cow numbers changed little from 1919 to 1945. Production per cow has gone up much more slowly than in some other regions. One restraining factor in increasing total cow numbers is the necessity of securing feed grains in the Corn Belt in competition with the Lake States. This situation may change as farmers learn to produce milk with a minimum of grain. Total farm production for the area was 19,826 million pounds or 16% of U. S. production in 1945.*

Lake States Mich., Wis., Minn.

More milk (24% of the U. S. total)* is produced here than in any other region. Production in 1945 was 29,808 million pounds* up 25% from the 1935-39 average. This was the result of favorable prices and the fact that there is no alternative livestock enterprise which is a serious competitor of the dairy industry. The productive capacity of milk drying plants in Lake Region was increased over 50% during the war.

Corn Belt Ohio, Ind., Ill., Iowa, Mo.

Beef cattle and hogs displaced dairy cows in some sections during the war largely because of labor shortages. Over the area as a whole, however, there was a slow increase in cow numbers and a 20% increase in production by 1945 as compared to 1935-39. Production in 1945 amounted to 26,140 million pounds or 21% of U. S. total*. Missouri accounted for a large share of the increase with production in 1945 34% greater than pre-war.

Appalachian Va., W. Va., No. Car., Ky., Tenn.

Production of milk in this region in 1945 was 21% above pre-war. Even with this expansion, total production that year amounted to only 8,662 million pounds or 7% of the U. S. total*. Before 1939 most of the milk produced was consumed on farms but by 1945 the proportion sold, in one form or another, exceeded 50% of total production, principally because of the greater output.

Southeast S. Car., Ga., Fla., Ala., Miss.

More than one-half the production in this region is normally consumed on the farm. 1945 production was 5,045 million pounds or 4% of the nation's total. In 1940 only 1 per cent of farms reporting cows and heifers had more than nine cows and 85% less than three cows. Military camp demands increased the percentage of milk sold off farms as whole milk, from 47% to 64% from pre-war to 1945.

South Central Ark., La., Okla., Texas.

In 1945 production of milk exceeded pre-war by 11%. The 9,304 million pounds produced represented 8% of the U. S. total. The increase in production resulted primarily from increased cow numbers, rather than production per cow. Sixty per cent of the farms reporting cows milked in this region have less than three cows

Great Plains N. Dak., S. Dak., Neb., Kan., Mont., Col. Wyo.

Three-fourths of the milk sold commercially in this region is marketed as farm separated cream. Skim milk is retained on the farm for animal and poultry feed. It produced 11,409 million pounds* or 10% of nationwide total in 1945. In 1942, production exceeded pre-war by 17%, but cow numbers declined in 1944, and by 1945 production declined to a level only 6% over 1935-39 average.

Pacific Northwest Idaho, Wash., Ore.

Wartime increases in population created a demand which resulted in a 15% increase in milk production by 1945 over pre-war. The 4,982 million pounds produced in 1945 was 4% of U. S. total*.

Pacific Southwest Ariz., Utah., Nev., Cal., N. Mex.

Average production per cow in this area is higher than any other region. Production by 1945 totaled 7,043 million pounds, exceeded pre-war by 29% and made up 6% of total for the U. S.* Rapid population growth due to war industries provided the stimulus for increased cow numbers and production per cow. California provides four-fifths of the production in this area, and produced 32% more milk in 1945 than pre-war.

Graphs from.
U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

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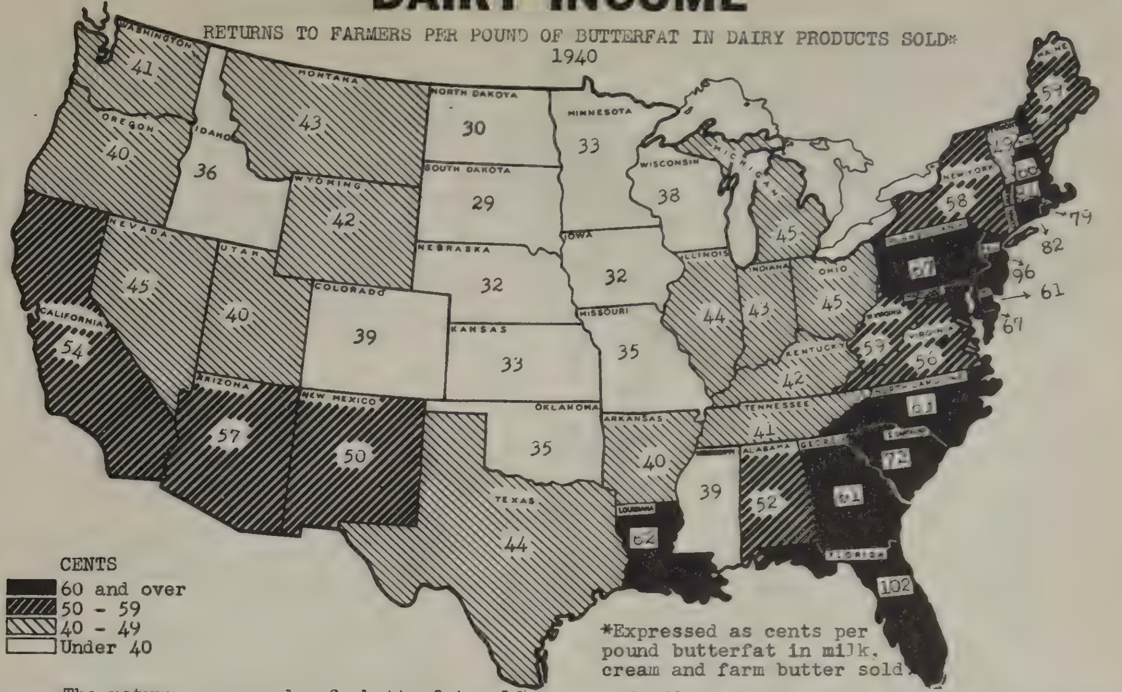
* 1945 figures are tentative.

DAIRY INCOME

RETURNS TO FARMERS PER POUND OF BUTTERFAT IN DAIRY PRODUCTS SOLD*

1940



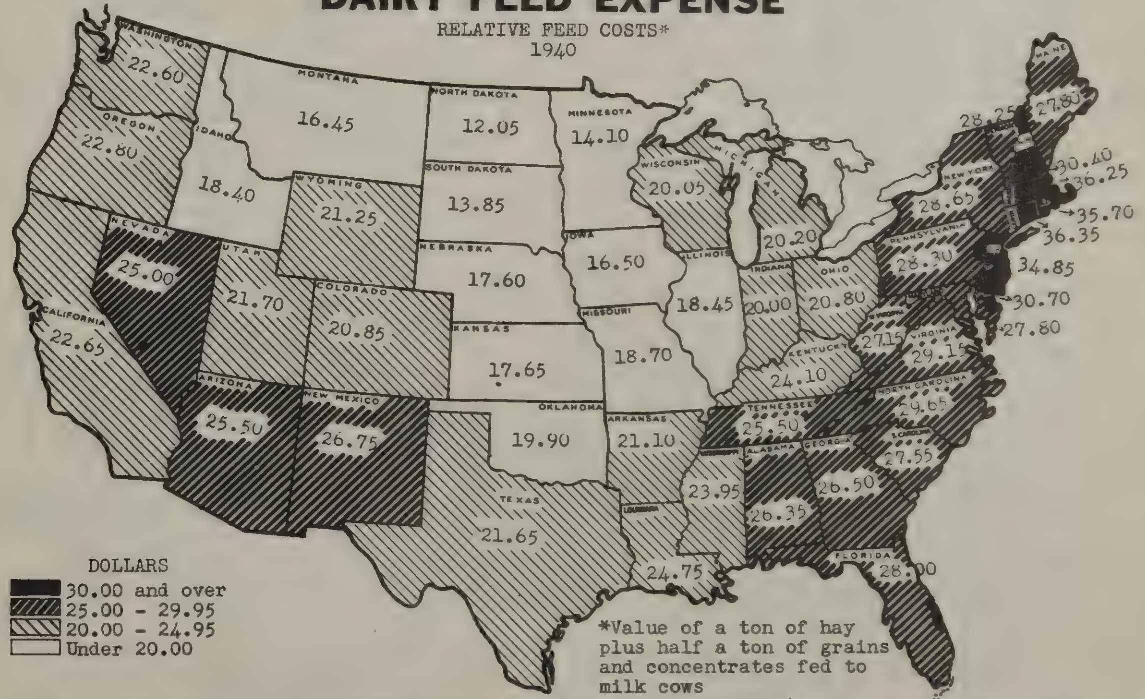
*Expressed as cents per pound butterfat in milk, cream and farm butter sold.

The return per pound of butterfat sold represents the dairy income in terms of butterfat regardless of the method by which it is sold. For example, in 1940 returns averaged 28 cents per pound for farm skimmed cream as compared with 46 cents for butterfat sold in milk at wholesale, and $1.21 for butterfat in milk retailed direct from the farms. This wide difference in return reflects to some extent the differences in production costs resulting from higher feed costs, sanitary requirements, frequency of delivery, bottling and retail costs, value of skim milk remaining on the farm, etc.

DAIRY FEED EXPENSE

RELATIVE FEED COSTS*

1940

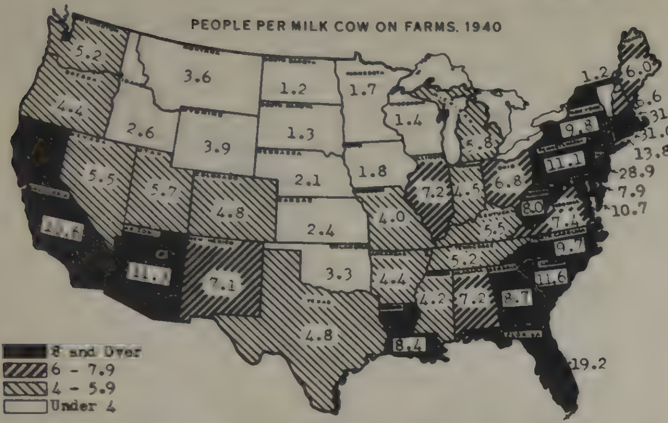


*Value of a ton of hay plus half a ton of grains and concentrates fed to milk cows

This map is based on conditions which existed in 1940, but general price relationships do not change radically. However, due to general recovery from drought conditions in North Dakota and some other portions of the drought area, feed costs in that section were unusually low. Differences in feed costs are the underlying factor affecting the farm price of butterfat. For this reason the cost-of-feed map and the return-per-pound-of-butterfat map show the same general pattern. In favored areas farmers increase production to a point where reduced prices offset the advantage of low feed costs.

Maps adapted from U.S.D.A.

DAIRY FACTS BY AREAS

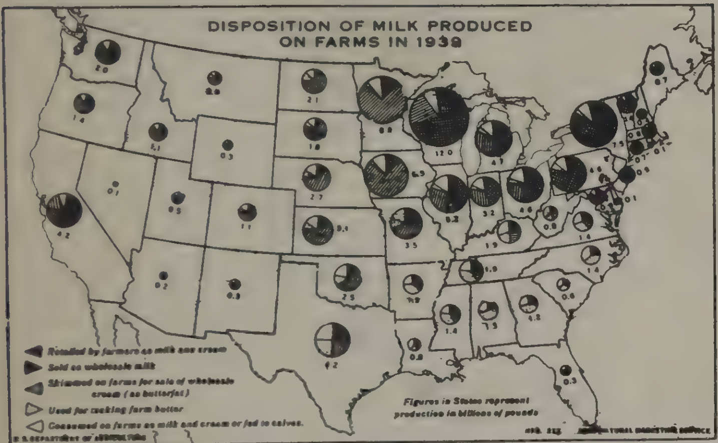


PEOPLE PER MILK COW ON FARMS, 1940

The number of people in a state is a rough measure of the demand for dairy products within the state and to some extent indicates the proportion of the dairy products produced which can be sold for high values.

Average returns per pound of butterfat ranged between 31 and 41 cents for most states having about 3 people per cow. For each additional person per cow butterfat prices averaged 10 per cent higher. For example, in states having 11 people per cow prices ranged from 57 cents in Arizona to 72 cents in South Carolina or about 80 per cent higher. This relationship does not hold in Wisconsin, New Jersey, nor New England states because of large inter-state shipments.

Farmers retail direct to consumers only a very small part of their total production.



DISPOSITION OF MILK PRODUCED ON FARMS IN 1939

Retailed by farmers as milk and cream
Sold as wholesale milk
Skimmed on farms for sale of wholesale cream (as butterfat)
Used for making farm butter
Consumed on farms as milk and cream or fed to calves.
Figures in States represent production in billions of pounds
U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

In the areas of dense population most milk is sold off the farm as wholesale milk.

In the midwest, and west - see Minnesota, Iowa, Kansas, Nebraska, and the Dakotas-most milk is skimmed on the farm and cream is sold wholesale on a butterfat basis.

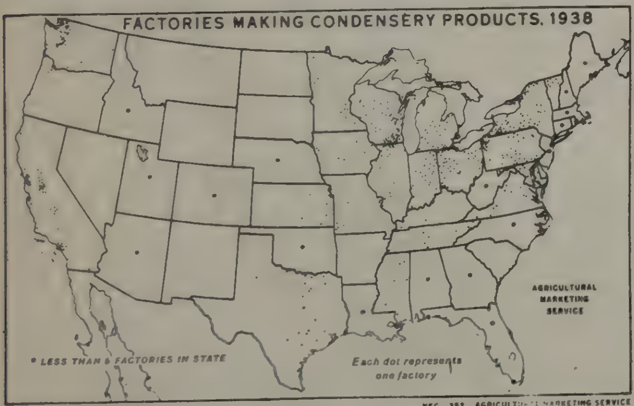
MANUFACTURED DAIRY PRODUCTS

At the present time efforts are being made to increase the production of cheese, condensed milk, and dried milk for our own military and civilian needs and for the needs of England.

Most of this increased production must come in the general areas where condensaries and cheese factories are already established and will result in a higher income to farmers of the principal dairy sections and especially in Wisconsin.

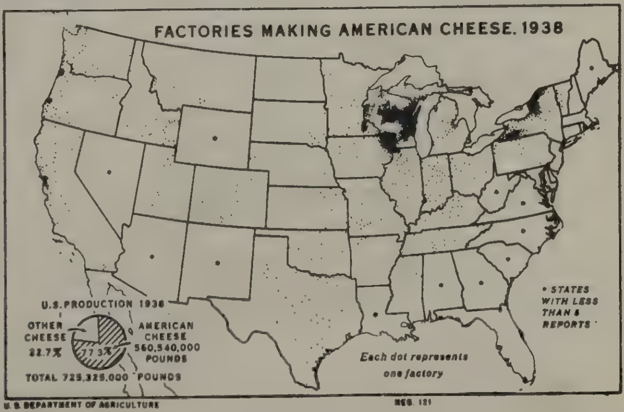
It is generally felt that the 6 to 8 per cent increase in dairy production needed for defense can be brought about by more feeding and without materially increasing the number of milk cows on the farm. More cows will be needed in the vicinity of large industrial cities, near large army camps, and in the South.

These facts indicate a substantially increased income to the dairy industry during the next two years or for the duration of the emergency. Farmers and businessmen with interests in the dairy section should not overlook such important facts as these and plan their policies accordingly.



FACTORIES MAKING CONDENSERY PRODUCTS, 1938

AGRICULTURAL MARKETING SERVICE
• LESS THAN 6 FACTORIES IN STATE
Each dot represents one factory
NEG. 352 AGRICULTURAL MARKETING SERVICE



FACTORIES MAKING AMERICAN CHEESE, 1938

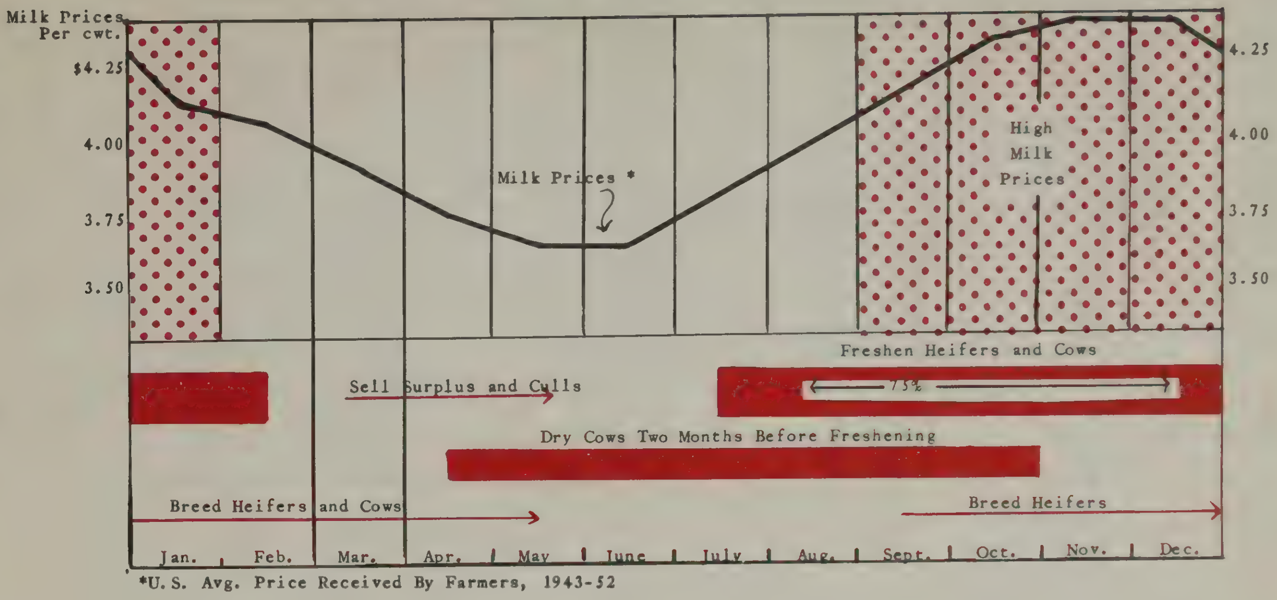
U.S. PRODUCTION 1938
OTHER CHEESE 22.7%
77.3%
AMERICAN CHEESE 560,540,000 POUNDS
TOTAL 725,325,000 POUNDS
Each dot represents one factory
• STATES WITH LESS THAN 6 REPORTS
U.S. DEPARTMENT OF AGRICULTURE
NEG. 121

Top map adapted from U.S.D.A.

(Printed in U. S. A.)

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

DOANE DAIRY SYSTEM



*U. S. Avg. Price Received By Farmers, 1943-52

Your dairy profit depends on:

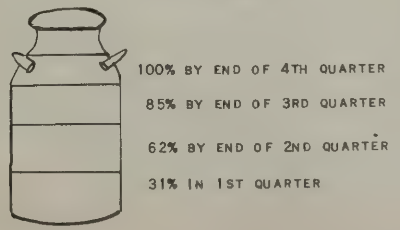
- Price received
- Amount of milk produced.
- Cost of Production.

Based on these factors, the Doane Dairy System has been developed for a 30 to 35 cow family dairy farm where milk is sold on the fluid market. The system can apply to other herds if kept in relation to the number of cows and intensity of operation. It is designed to cut feed and labor costs and to have the greatest amount of milk going to market when the price is best.

TIMELY MARKETING

Highest milk prices will be obtained by breeding 75 per cent of your herd between late August and January. More than 40 per cent of a cow's production is in the first 4 months of lactation. Get this milk in the last 4 months of the year.

MILK PRODUCED IN LACTATION PERIOD BY PER CENT


100% BY END OF 4TH QUARTER
85% BY END OF 3RD QUARTER
62% BY END OF 2ND QUARTER
31% IN 1ST QUARTER

Fall Freshening cows are most profitable. They produce more milk and butterfat and more of it is sold at higher prices.

Higher prices for milk now extend over a longer period of the year. This makes it possible to freshen your herds over a longer period in the fall and still take advantage of the market when prices are best.

Late summer or early fall freshening takes advantage of rising milk prices as well as good fall pastures. Late fall and winter freshening advantage will be higher prices for a longer period with a slow decline coming while cattle are on spring pastures.

GETTING THE MOST MILK

Quality of herd may easily determine the difference in profit and loss. A cow must produce more than 5,000 pounds of milk or about 200 pounds of butterfat to make a profit. Basic Dairy Herd Improvement Association practices are best for herd improvement.

- Cull out low producing cows.
- Feed cows according to production.
- Select the best animals as breeders.

At the age of 7 years a cow is usually producing her greatest amount of milk and butterfat. This will vary, but after 10 years a decline in production can usually be expected.

Breeds -- There is no best breed for all farms or for all milk sheds. The breed selected should depend on local conditions and markets. Some markets demand higher butterfat milk than others. Some pay other premiums. Trend will be to less and less premium for butterfat.

Raising your own breeding stock is a money-saving proposition. Artificial insemination to obtain good stock is often good business.

DOANE AGRICULTURAL DIGEST ® APR., 1953
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DOANE DAIRY SYSTEM

KEEP COSTS LOW

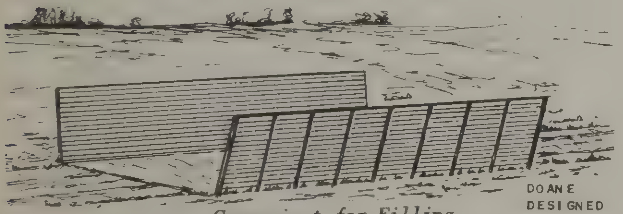
Greater efficiency can usually be obtained with a maximum number of cows per man. The number, however, must fit the management arrangements, pasture and forage production, and general conditions of the farm.

Costs of producing milk have increased about 125 per cent since the 1935-39 period. Feed and bedding account for about 45 per cent of the cost of milk production; labor 30 per cent; housing and equipment 5 per cent; breeding and replacement 4 per cent; and miscellaneous 13 per cent. The most likely place for cutting cost is in labor and feeding. Better management and more efficient production are necessary to overcome these increasing costs.

High Quality Roughage trims feed costs even where prices are down. Feeding liberal quantities of high quality roughage, (corn silage and hay,) and a small amount of grain is more profitable than feeding a large amount of grain or all roughage, according to a University of New Jersey study.

A feeding ratio of one pound of grain per six pounds of milk is more profitable than a one to three ratio. Grass silage with hay will give about the same results as corn silage. High grain prices may make a lower grain ratio even more profitable. A trench or bunker silo and self feeding facilities are handiest for storing grass silage.

A NEW PROVEN IDEA, A BUNKER SILO



- *Convenient for Filling*
- *Convenient for Feeding*

The first cutting of forage crops should be ensiled. This preserves the abundant early growth that might otherwise go to waste. Weather is more suited to hay harvest at later cuttings. Hay must be cut at the proper stage to insure best quality and give plenty of time for growing the next cuttings. Permanent and rotation pasture should furnish most of the feed for seven months or longer.

Labor Efficiency -- Storing hay at ground level cuts labor in half for harvesting and storing. When fed directly out of storage 2/3 of the labor can be eliminated.

Total chore time can be reduced to 40 man hours per cow per year with elevated stalls, a pipeline milker and a loose-housing arrangement compared to 100 to 120 hours for stanchion or tie-stall arrangements.

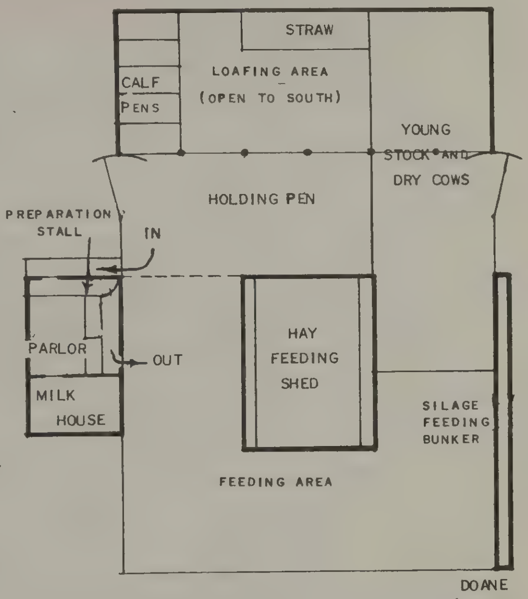
With the use of a preparation stall, machine idle time can be reduced from 40 to 50 per cent down to 15 to 20 per cent for over-all milking time. It also aids in faster milking.

Pipeline milkers are one of the biggest timesavers now available to dairymen. Bulk handling equipment, like the cold-wall milk coolers, can also help cut time requirements. Many markets now have pick-up tanks available.

Other time-savers you'll want to explore -- silage conveyors, self-feeding hay storage, and bulk feed handling.

Loose Housing Dairy Systems go far to ease dairy cost burdens. Initial building costs are 1/3 to 1/2 less than conventional stanchion barns if pole frame construction and open fronts are used. But the biggest saving comes in more efficient livestock handling made possible in this system.

LOOSE HOUSING LAYOUT



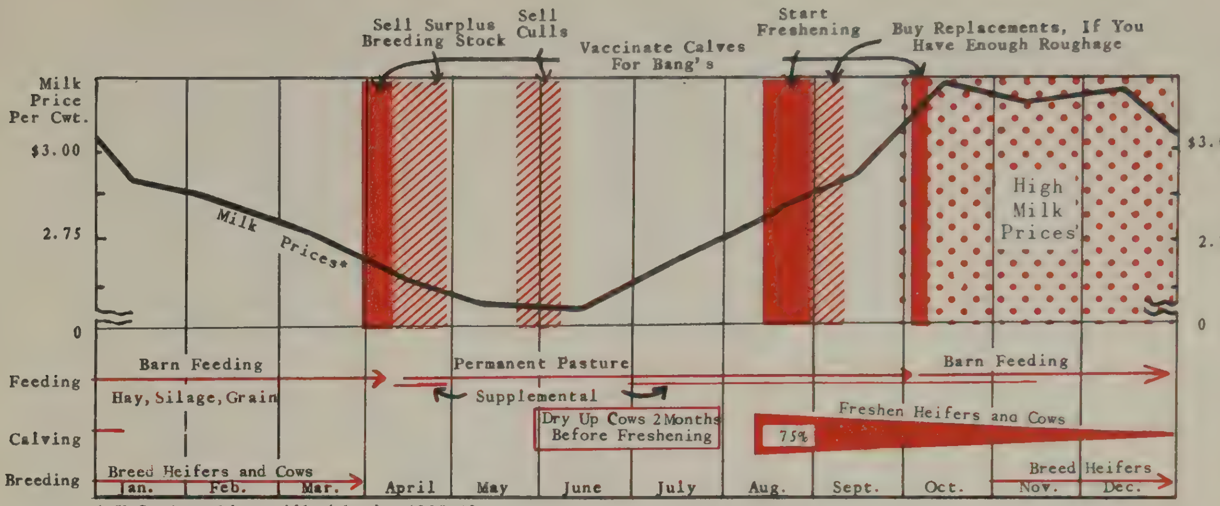
Some management rules you'll need to know in a loose housing system are --

- → Adequate drainage away from the building is necessary.
- → In northern areas, windbreaks are needed.
- → Cows have to be dehorned.
- → Loafing and feeding areas should be separated.
- → Bedding needs to be adequate and dry.
- → Surfaced feedlots are needed.

Loose housing systems pay off with better cow health, less wasted feed and less udder trouble, besides saving labor.

Replacement Cow Cost can be trimmed down considerably by using a roughage system of calf raising. Remove the calf from the cow after 3 days and hand feed milk, Have green, leafy, soft hay in front of the calves at all times. At about the second week, place a bit of cud from an older cow's mouth in the calf's. Keep hay available and limit grain or milk substitute feeding rates.

DOANE DAIRY SYSTEM



* U.S. Avg. Mkt. Milk (Who.), 1935-49

The Doane Dairy System is outlined for handling 20-30 cow dairies where milk is sold on the fluid market. The principles of this system apply to other herds but need to be modified to take advantage of the seasonal price patterns of milk and feed.

Fall Freshening Cows in many herds are the most profitable ones, especially during periods of falling prices. They produce more milk and butterfat and more of it is sold at higher prices. More income is left after the feed bill is paid, even though the bill is higher.

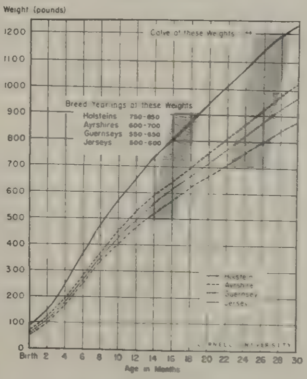
Plan to breed at least one-half of the heifers to calve in the late summer. By the time they drop their third or fourth calf they will be freshening in fall or winter -- the seasonal high for milk prices. A fall calf will be large enough by spring to make good use of pasture and with good management can be grown out to freshen in the fall two years later.

EFFICIENCY FACTORS

FACTOR	GOOD	V. GOOD
Frequency of Calving	13 Mos.	12 Mos.
Average Age of Milking Herd	5.2 Yr.	6.4 Yr.
Percentage of Herd Calving in Fall	40%	60%
Pounds Milk Sold per Cow	8,500	10,000
Pounds Fat Sold per Cow	340	400
Hundredweight of Milk Sold per Man per year	1,250	1,700
Number of Cows Milked Per Man Per Hour	15-20	20-25

Based on Actual Farm Cost Account Records

Maximum production per cow and per man will result in good returns even where most of the feed is bought. On farms where the feed is raised, high crop yields and efficiency in handling the crops are also necessary. You are putting an unfair burden on the herd if you charge it for home-grown crops that cost more than you could buy the feed for. Follow a rotation adapted to your farm and area -- one that will provide good pasture for as much of the year as possible.



BREED -- There is no best breed for all farmers or all milk sheds. The breed selected should depend on local conditions and markets. Some markets demand higher butterfat milk than others, some pay other premiums. Registered cattle involve more cost, and their profitableness will depend on how good a market you can develop for your extra heifers and bulls.

Continued Close Culling is necessary for long-time herd improvement -- continued profits. Actual herd records regularly show the advantages of a high producing herd. According to a Purdue study:

- Labor returns per hour in the high producing herds was 84.6 cents compared with 8.1 cents in the low producing herds.

- Returns from each dollar's worth of feed consumed in the high group was $2.75 as compared with $1.65, the returns from the low producing group of cows.

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CARE OF NEWBORN CALF

As soon as the calf is born see that its nose and mouth are free of mucous. Allow the cow to lick her calf dry, but remove the afterbirth. Disinfect the calf's navel cord with tincture of iodine. Wash thoroughly the cow's udder and teats and check the milk.

If the calf doesn't get up within an hour, help it to stand and get some of the colostrum milk. When no colostrum milk is to be had, substitute an egg-white emulsion. Make it by mixing the whites of six eggs with fresh milk. Use one less egg each time.

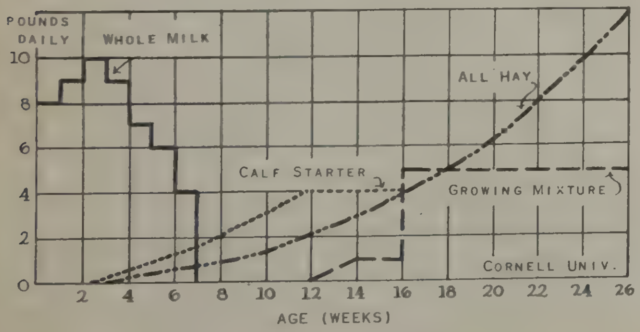
Remove the calf after the first feeding, or after the first day, but keep it on its mother's milk four days at least. Feed the milk in a clean pail at body temperature -- a nipple pail is best. If an ordinary pail is used, hang it a foot above the ground so the calf won't gulp the milk. Limit milk to 10 per cent of the calf's weight. For the first week feed three times a day, if labor permits. Later, twice a day.

HOW MUCH WHOLE MILK

Most economical is to use as little whole milk as possible and yet grow a thrifty calf. In other than fluid markets, labor may be the deciding factor especially as prices decline. Using a fresh cow with a congested udder, or a hard milker, to nurse 4 calves at a time saves the most labor. Low testers are preferable. A good nurse cow can raise 10 calves a year.

After 3 days, many dairymen start feeding a milk substitute that replaces milk entirely by the fourth week. With high milk prices this is cheapest, but requires careful supervision so that the calf will make normal growth.

Feeding dry starter and good hay early, saves milk and develops good calves.



This is a guide for the dry-calf starter method of feeding Holstein, Brown-Swiss and Ayrshire calves. Jerseys and Guernseys should be fed less, and kept on milk until 10 weeks old. This method saves about 400 pounds of milk. Feed each calf carefully and according to its own needs.

The University of Wisconsin recommends the following home-made calf starter: 30 pounds ground yellow corn, 30 pounds crushed oats, 10 pounds wheat bran, 10 pounds linseed oil meal, 10 pounds soybean oil meal, 10 pounds skim milk powder, 1 pound salt, containing minerals, and two-fifths ounce irradiated yeast.

At 12-14 Weeks start calves on a growing ration. A good one is -- 30 pounds ground corn and cob meal, 30 pounds ground oats, 28 pounds wheat bran, 10 pounds soybean or linseed oil meal, 1 pound salt and 1 pound steamed bone meal. Continue on good legume hay and have a mineral mixture available.

Keep calves under six months off pasture. Heifers on pasture should be fed some grain -- at least two pounds daily until they are 10 months old. They should also have free access to salt, minerals and water. Check them occasionally to see if they are making normal gains.

After 10 Months heifers can make satisfactory growth on good pasture without additional grain. If pasture is poor, feed supplemental hay or grain. Breed heifers according to size (graph page 246.3) and feed them so their size is average or above at freshening. Two months before freshening, a heifer should be given about five pounds of regular grain ration per day. Reduce grain a week before freshening and substitute a few pounds of a laxative ration.

CALF MANAGEMENT

- Mark and identify soon after birth.
- Dehorn when one to two weeks old.
- Remove extra teats before a year of age. Check with veterinarian.
- Vaccinate calves against Bang's disease when 6 to 8 months old.

COST OF RAISING DAIRY HEIFERS

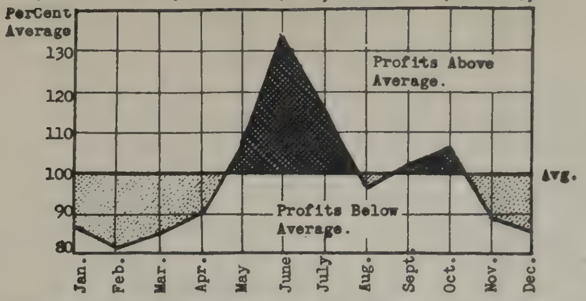
In market milk sheds the cost of raising heifers generally exceeds their sale price, but the advantages of home raised replacements usually outweigh this. Home-grown replacements are necessary when following a definite herd improvement and breeding plan, they are generally of higher quality, eliminate a large cash outlay and reduce the chances of bringing disease into the herd.

Feed accounts for about 75 per cent of the cost of raising heifers to 2 years, labor about 12 per cent. Average feed required to 2 years of age is about 1000 pounds concentrates, 2 tons hay, 2 tons silage and 750 pounds milk. About 40 hours of labor are needed.

Veal Calves -- It takes about 10 pounds of milk to produce a pound of gain in a young calf. Unless the calf is large or milk is cheap, producing veal is uneconomical.

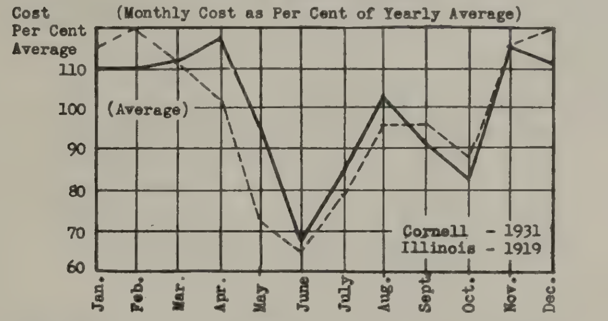
DAIRY—WHEN TO SELL MILK AND BUTTERFAT

RELATIVE SEASONAL PROFITS OF PRODUCING MILK
Determined by using Monthly Farm Price of Milk as
Per Cent of Monthly Production Cost
(Price - U.S. 15 Yr. 1927-41 Av; Cost-Ill. 1919 Data.)



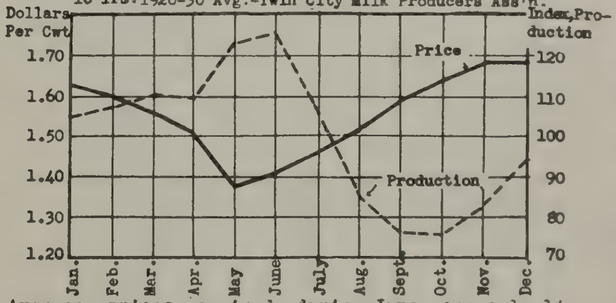
The most profitable period to produce milk and butterfat under average conditions is in the spring when pasture makes possible a very substantial saving in costs.

SEASONAL COST OF PRODUCING
100 Pounds of Milk
(Monthly Cost as Per Cent of Yearly Average)



Production costs in June are only 55 per cent of the winter peak and for the grazing season, "Pasture, as a source of cheap feed and as a factor in reducing labor requirements, made it possible to produce milk more cheaply (approximately 30 per cent less) in the summer than in the winter." Cornell University.

SEASONAL PRICES AND PRODUCTION
U.S. Monthly Average Prices Received by Farmers
15 Yrs. 1927-41 Milk Equivalent and Index of Production
10 Yrs.1920-30 Avg.-Twin City Milk Producers Ass'n.



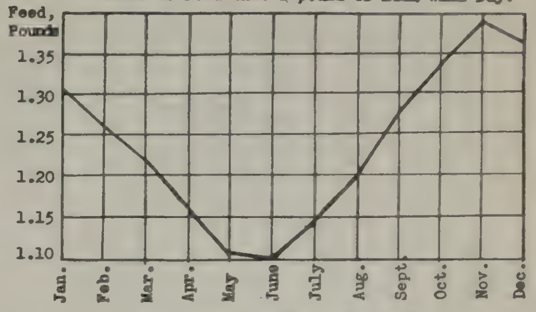
Average prices received during June are only 14 per cent below the winter peak as compared to the 45 per cent reduction in production cost. This is 3 to 1 in favor of heavy spring production. To insure maximum profits, provide plenty of pasture for dairy cows and use it effectively.

The first objective of a successful dairy program should be to produce as much milk and butterfat from pasture as possible. By providing an abundance of good pasture throughout the growing season many of the advantages of the June period as shown in the first graph above can be secured throughout the entire growing season (see Digest pages 176.1 to 178.2 for pasture suggestions). Plan the pasture program to reduce supplemental feeding to a minimum.

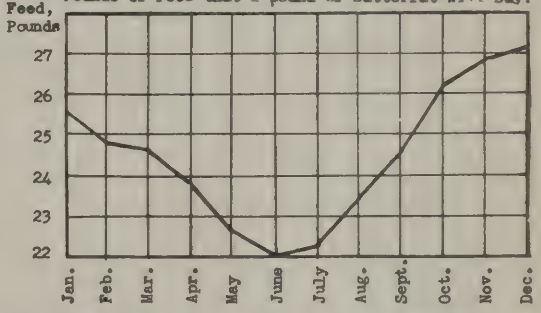
When the available pasture has been fully utilized attention should shift to the winter dairy program. Milk and butterfat prices are high relative to feed costs during the winter season and every pound sold will normally buy about 30 per cent more feed. Total costs however are higher and more than offset this advantage with the result that at average prices, profits per 100 pounds of milk are only 75 per cent of the summer period.

Sources: University of Illinois, Bulletin 224; Cornell University, Bulletin 641; University of Minnesota; U.S.D.A., Bulletin 1069.

MILK - Feed Price Ratio
U.S. Monthly Average - 20 years 1923-1942
Pounds of Feed that 1 pound of Milk Will Buy.



BUTTERFAT - Feed Price Ratio
U.S. Monthly Average - 20 years 1923-1942
Pounds of Feed that 1 pound of Butterfat Will Buy.

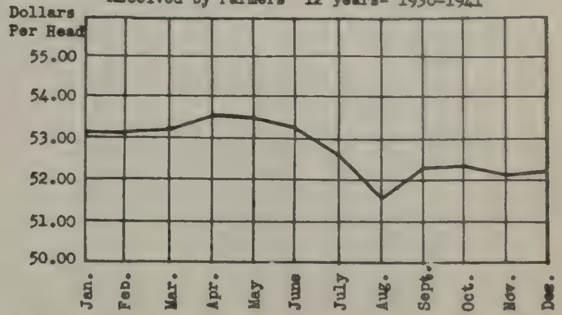


When production is based on barn feeding and limited pasture, a program of winter production is normally most profitable because feed costs are lower relative to prices received than during the summer. Labor requirements for winter production are high but this is the time of the year when there is usually a surplus of labor available.

For wholemilk producers who sell on a marketing quota the winter dairy program has the additional advantage of insuring the broadest possible marketing basis, and makes it possible to sell a larger proportion of the low cost spring and summer production at the most favorable price. The average price thus insured is substantially higher than would otherwise be possible.

WHEN TO SELL MILK COWS

PRICE OF MILK COWS
U.S. Monthly Average Price Per Head
Received by Farmers 12 years- 1930-1941



The normal price trend of dairy cows follows closely the seasonal trend of production. The average difference from low to high is less than 5 per cent. When there is a choice, (after giving full consideration to the effect on production of the herd) heifers, excess cows and old cows should be sold in the spring. Herds should be replenished with young stock in the fall.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

DAIRY PROFIT CONTROLS

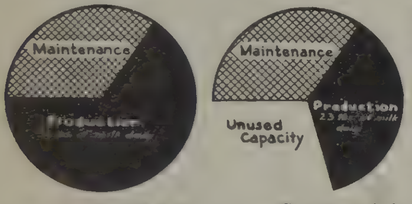
Production costs are of more importance to the individual producer than the price received. He can do little about the price received other than determine how, when and where he will sell his products but production costs are largely under his control.

FEED COSTS MOST IMPORTANT

Feed costs make up 50 to 60 per cent of the average cost of producing milk, labor another 25 to 30 per cent. Taken together feed and labor costs made up 68 to 93 per cent of the seasonal production costs on a group of farms studied by Cornell University in 1931. The producer can hold these costs to a minimum by:

1. Use most economical feed -especially pasture
2. Feed for optimum production
3. Increase average production per cow - selection, good breeding and culling
4. Organize work - use labor saving equipment.

Economical feeding cannot be stressed too much. The successful dairyman must be constantly studying the relative costs of various feeds and shifting his feeding program to meet the changes that occur. (See Digest page 517 for Feed Buying Guide and page 535 for Feed Substitution Tables). Pasture as stressed on page 246.3 is the cheapest feed and should be fully utilized. "While the cows were on pasture, the daily feed cost per cow was less than one-half as much as when the cows were barn-fed. Some of this saving was in the cost of concentrates but a larger part was in the cost of roughage." Cornell University.



A cow capable of producing 60 pounds a day, if adequately fed, uses about a third of her nutrients for maintenance and the rest for production.

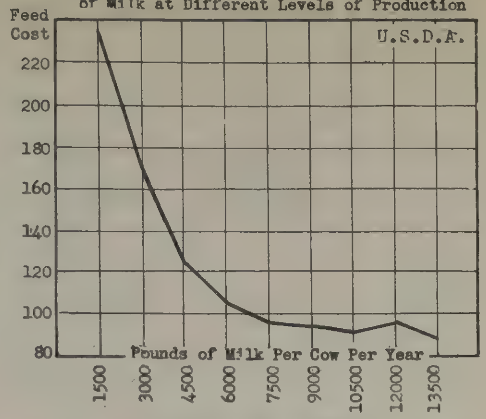
The same cow inadequately fed uses about half of her feed nutrients for maintenance and therefore produces less efficiently.

Iowa State University

The feeding program should be set up to secure the optimum production per cow. This does not mean maximum production but it does mean greatest profit. Feeding which fails to utilize the full normal capacity of the cow is expensive because the maintenance requirements of the cow must be satisfied before she has a surplus for milk production. See table "Let Your Roughage Be Your Guide" at bottom of this page for feeding instructions.

As production per cow goes up, the cost of producing milk drops rapidly until an average of about 8,000 to 9,000 pounds of milk per cow per year is reached. Similar data on cost of producing butterfat shows that feed cost declined until production reached 450 to 480 pounds per cow per year. Cows with low inherent production should be eliminated.

FEED COST PER 100 Pounds of Milk at Different Levels of Production



USE LABOR EFFICIENTLY

An average of 143 man hours of labor per year are required to care for a dairy cow, including 12 hours for young stock. The average daily labor requirement is 22 minutes per cow of which 13 minutes or 60 per cent is for milking.

Chores should be arranged to eliminate as many steps and as much hand labor as possible. "A milking machine reduces the labor of milking about 50 per cent. For a 15 cow herd the saving in labor for milking by use of a milking machine is about 60 hours per month . . .It is generally considered by most users of milking machines that 12 or more cows will justify the purchase of a milking machine, particularly if the farm is short of labor." Ohio University.

MILK CORRECTLY

Rapid milking is to be encouraged regardless of whether milking is done by hand or with a machine. Rapid milking helps the cow to help the milkers to get more milk per cow and saves one minute or more per cow per milking.

"The steps in rapid milking may be outlined as follows:

1. Massage the cow's udder in the process of washing it with warm water. This causes release of the hormone which prepares the cow for milking.
2. Start milking about one minute later. The milk will now be available for rapid removal. The milk should be removed in 3 or 4 minutes. If milking by machine, strip the cow by pulling down on the teat cups with one hand while massaging the udder with the other hand. Some cows may require hand stripping after the machine is removed. Strip rapidly.
3. Stop milking or remove the machine as soon as the milk stops flowing." Missouri University.

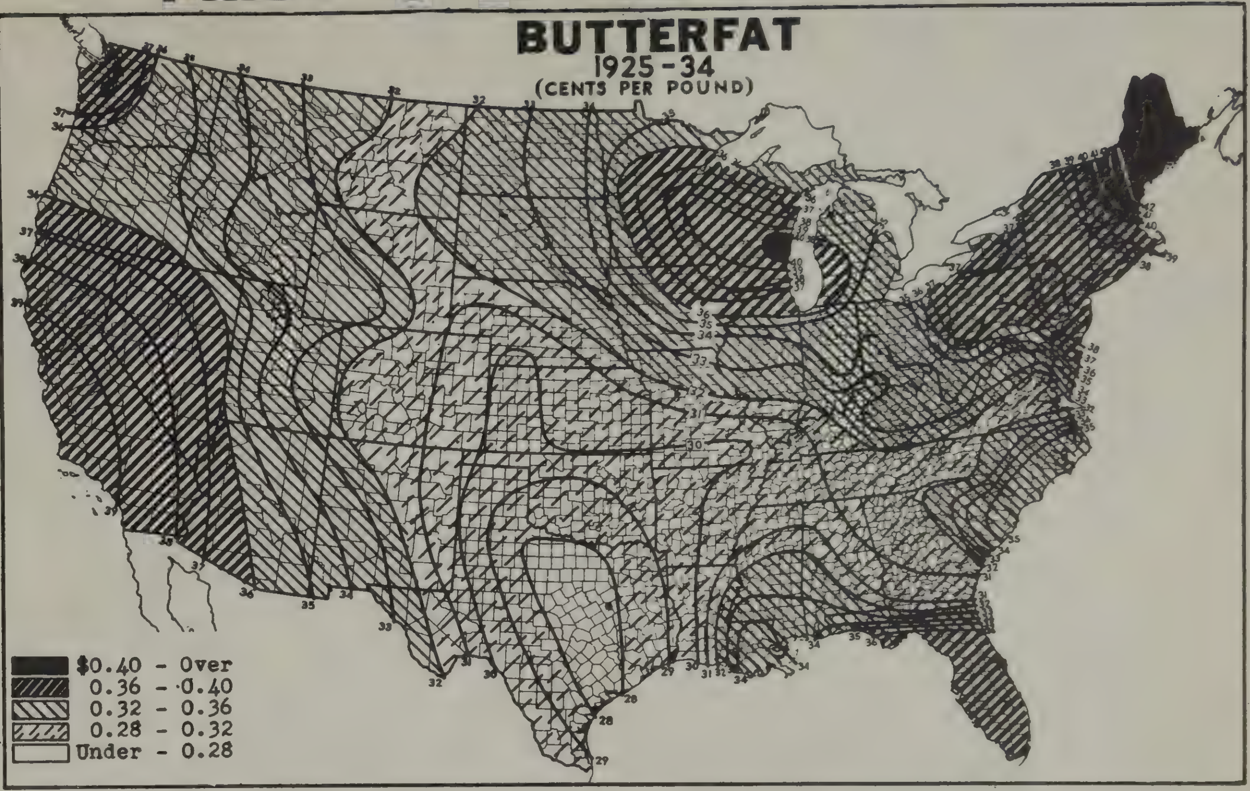
LET YOUR ROUGHAGE BE YOUR GUIDE

	Non-Legume	Mixed	Legume	Pasture
With this kind of roughage → feed ↓	Corn silage, corn stover, oat hay, cane, timothy, soybean straw, sudan, or other non-legumes.	Corn silage, stover, cane, timothy, or other non-legumes, with alfalfa, clovers, soybeans or cowpeas.	Cowpeas, soybeans, alfalfa or clover.	Sweet clover, Korean, sudan, barley, wheat, rye bluegrass or other permanent pasture.
This mixture of grain →	Ground corn 400 Wheat bran 300 Cottonseed meal 300 Steamed bone meal 20 Salt 15	Ground corn 600 Wheat bran 250 Cottonseed meal 150 Steamed bone meal 15 Salt 15	Ground corn 600 Ground oats 200 Wheat bran 200 Steamed bone meal 10 Salt 15	Ground corn 700 Wheat bran 200 Cottonseed meal 100 Steamed bone meal 15 Salt 15
Approximate protein content	Crude 20.0 Digestible 16.5	Crude 16.0 Digestible 12.5	Crude 11.0 Digestible 8.5	Crude 14.5 Digestible 11.5
Amount to feed	Feed Jersey or Guernsey cows 1 lb. of grain for each 3-4 pounds of milk produced. Feed Holsteins, Brown Swiss or Shorthorns 1 lb. of grain for each 4-5 pounds of milk produced.			Jersey or Guernsey 1 lb. feed to each 4-5 lbs. of milk produced. Holstein or Shorthorn 1 lb. feed to each 5-6 lbs. of milk produced.
Substitutes for corn	Corn and cob meal, barley, hominy feed, pound for pound. Up to 50% of the corn may be replaced and an equal weight of ground wheat sorghum Grains or blackstrap molasses.*			
for bran	Oats, alfalfa meal, or wheat middlings, pound for pound.			
for cottonseed meal	Linseed oil meal, gluten meal, soybean oil meal, crushed soybeans, pound for pound.			

*Blackstrap molasses is palatable and much relished by dairy cows. Molasses may be poured on the grain feed direct in the manger at feeding time. When poor quality of roughage is used the molasses may be added directly to the roughage and thereby increase its palatability.

University of Missouri

PRICE ZONES - AVERAGE PRICES RECEIVED BY FARMERS



BUTTERFAT
1925-34
(CENTS PER POUND)

Average prices received by farmers for butterfat, by crop reporting districts, 1925-1934 (Cents per pound)

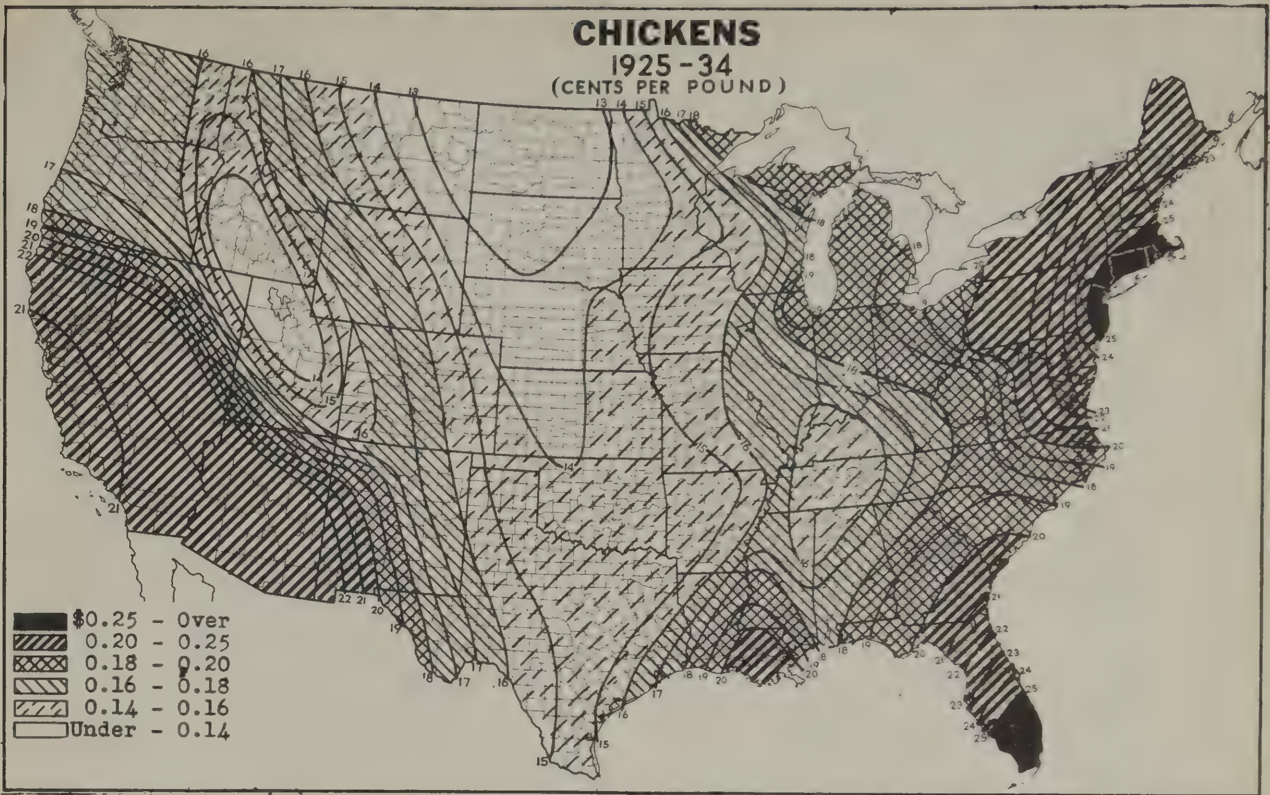
State	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	42	-	-	44	-	43	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38
New York	-	-	-	40	-	37	36	-	39	-	38	-	37	36	37	38	-	-
New Jersey	-	-	-	36	-	-	-	-	39	-	-	-	-	*	-	-	-	-
Pennsylvania	37	-	-	37	-	41	37	-	36	-	43	-	38	34	47	-	-	-
Ohio	34	-	-	34	-	37	33	-	34	-	36	-	33	32	33	-	-	-
Indiana	33	-	-	34	-	34	33	-	35	-	33	-	32	33	33	-	-	-
Illinois	35	-	-	-	-	35	33	33	33	-	33	32	31	-	31	-	-	-
Michigan	36	-	-	34	-	34	36	-	36	-	35	-	36	36	34	-	-	-
Wisconsin	39	-	-	38	-	38	39	-	39	-	41	-	37	38	38	-	-	-
Minnesota	35	-	-	36	-	37	36	-	37	-	38	-	35	37	38	-	-	-
Iowa	35	-	-	37	-	38	34	-	35	-	36	-	33	33	34	-	-	-
Missouri	32	-	-	32	-	32	31	-	31	-	32	-	30	30	31	-	-	-
North Dakota	32	-	-	33	-	33	32	-	33	-	34	-	32	33	33	-	-	-
South Dakota	32	-	-	33	-	34	32	-	33	-	33	-	32	32	33	-	-	-
Nebraska	31	-	-	32	-	32	-	-	31	-	31	-	29	31	32	-	-	-
Kansas	30	-	-	31	-	32	30	-	31	-	31	-	30	31	31	-	-	-
Delaware	-	-	-	*	-	-	-	-	34	-	-	-	-	40	-	-	-	-
Maryland	40	-	-	38	-	35	40	-	31	-	43	-	-	-	-	-	-	-
Virginia	-	-	-	33	-	-	34	-	32	-	31	-	31	32	33	-	-	-
West Virginia	34	-	-	35	-	33	33	-	34	-	36	-	-	34	-	-	-	-
North Carolina	32	-	-	34	-	36	32	-	31	-	35	-	-	30	35	-	-	-
South Carolina	34	-	-	33	-	35	33	-	35	-	-	-	-	34	-	-	-	-
Georgia	27	-	-	31	-	31	32	-	32	-	31	-	31	31	30	-	-	-
Florida	39	-	-	-	-	34	-	-	42	-	-	-	-	39	-	-	-	-
Kentucky	31	-	-	32	-	31	32	-	34	-	34	-	-	-	-	-	-	-
Tennessee	31	-	-	30	-	31	32	-	32	-	32	-	-	-	-	-	-	-
Alabama	32	-	-	30	31	32	32	-	31	-	31	-	33	30	31	-	-	-
Mississippi	33	-	-	30	-	29	31	-	30	-	33	-	32	30	32	-	-	-
Arkansas	30	-	-	30	-	31	30	-	31	-	32	-	30	30	29	-	-	-
Louisiana	34	-	-	31	-	36	30	-	32	-	35	-	30	33	34	-	-	-
Oklahoma	30	-	-	30	-	30	29	-	29	-	30	-	29	29	29	-	-	-
Texas	-	29	30	28	-	28	28	-	29	-	32	-	29	28	28	-	30	-
Montana	34	-	-	33	-	31	-	-	31	-	-	-	34	31	33	-	-	-
Idaho	35	-	-	-	-	-	-	-	-	-	-	-	35	33	33	-	-	-
Wyoming	32	-	-	32	-	34	35	-	31	-	-	-	-	-	-	-	-	-
Colorado	32	-	-	32	-	32	33	-	31	-	31	-	32	32	31	-	-	-
New Mexico	33	-	-	-	-	31	-	-	-	-	-	-	35	-	33	-	-	-
Arizona	-	-	-	36	-	-	-	-	39	-	-	-	35	-	36	-	-	-
Utah	36	-	-	-	-	-	-	-	33	-	33	-	34	-	-	-	-	-
Nevada	38	-	-	-	-	38	-	-	-	-	-	-	-	40	-	-	-	-
Washington	38	-	-	35	-	34	-	-	37	-	-	-	-	-	34	-	-	-
Oregon	36	-	-	36	-	35	-	-	-	-	-	-	36	36	-	-	-	-
California	39	-	-	37	-	38	39	-	38	40	38	-	-	38	-	-	-	-

* Data not available.

U.S. DEPARTMENT OF AGRICULTURE

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo

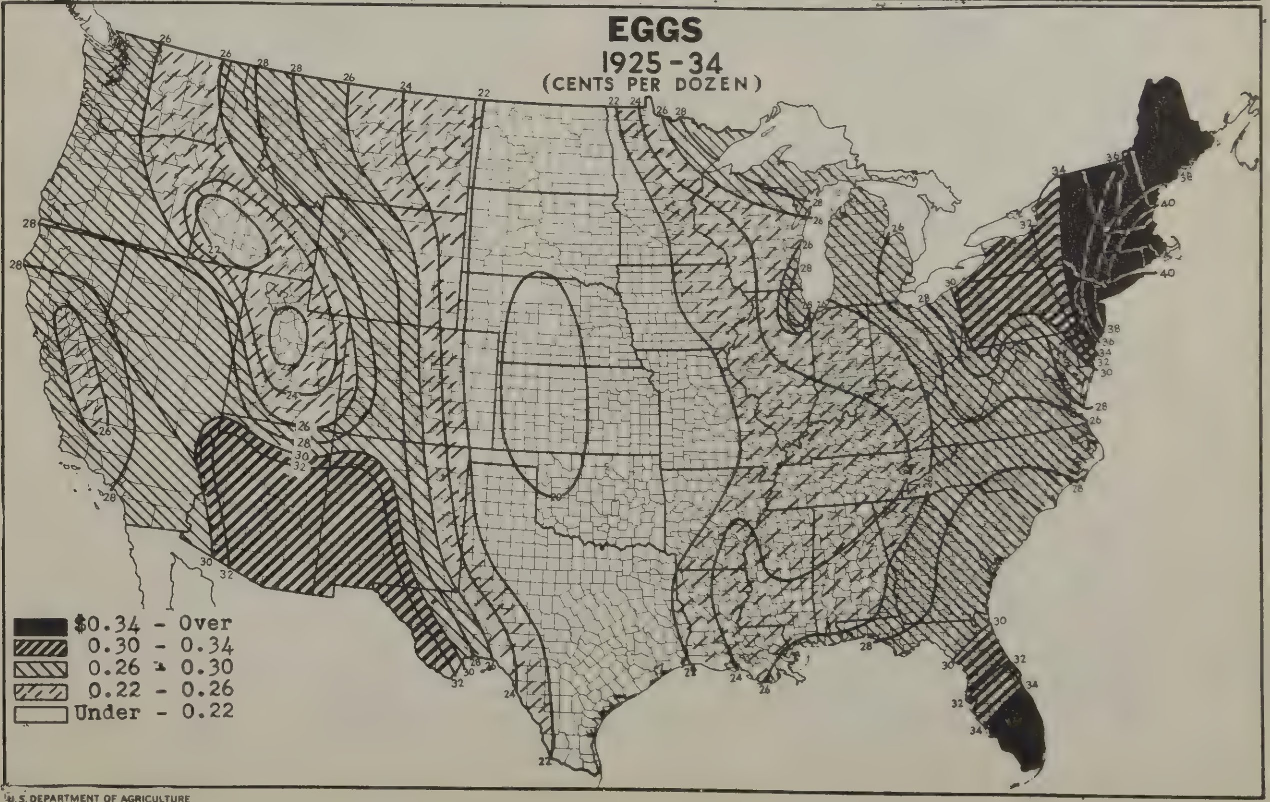
PRICE ZONES – AVERAGE PRICES RECEIVED BY FARMERS



CHICKENS

1925-34

(CENTS PER POUND)



EGGS

1925-34

(CENTS PER DOZEN)

U.S. DEPARTMENT OF AGRICULTURE

CHICKENS — Average prices received by farmers for chickens, by crop reporting districts, 1925-1934 (Cents per pound)

State	Crop reporting district																	
	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	23	-	-	22	-	22	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
New York	-	-	-	21	-	21	21	-	21	-	24	-	20	20	25	25	-	-
New Jersey	-	-	-	24	-	-	-	-	26	-	-	-	-	25	-	-	-	-
Pennsylvania	20	-	-	21	-	23	21	-	21	-	24	-	21	20	22	-	-	-
Ohio	18	-	-	19	-	20	18	-	18	-	19	-	19	18	18	-	-	-
Indiana	18	-	-	18	-	18	18	-	18	-	18	-	16	17	18	-	-	-
Illinois	18	-	-	-	-	19	16	16	17	-	17	17	17	-	16	-	-	-
Michigan	20	-	-	17	-	18	17	-	16	-	18	-	18	18	19	-	-	-
Wisconsin	15	-	-	17	-	17	15	-	16	-	17	-	16	17	19	-	-	-
Minnesota	13	-	-	15	-	20	14	-	14	-	15	-	14	15	16	-	-	-
Iowa	15	-	-	16	-	16	15	-	15	-	17	-	16	16	16	-	-	-
Missouri	16	-	-	16	-	17	16	-	16	-	17	-	15	15	16	-	-	-
North Dakota	13	-	-	13	-	13	13	-	13	-	13	-	12	13	13	-	-	-
South Dakota	12	-	-	14	-	14	14	-	14	-	15	-	14	13	15	-	-	-
Nebraska	14	-	-	14	-	15	-	-	14	-	15	-	13	14	15	-	-	-
Kansas	14	-	-	14	-	15	14	-	14	-	15	-	15	14	15	-	-	-
Delaware	-	-	-	26	-	-	-	-	23	-	-	-	-	22	-	-	-	-
Maryland	21	-	-	22	-	22	23	-	23	-	24	-	-	-	-	-	-	-
Virginia	-	-	-	21	-	-	20	-	21	-	23	-	18	20	22	-	-	-
West Virginia	18	-	-	19	-	19	18	-	17	-	19	-	-	22	-	-	-	-
North Carolina	17	-	-	21	-	21	17	-	19	-	18	-	-	18	19	-	-	-
South Carolina	19	-	-	20	-	20	20	-	21	-	-	-	-	20	-	-	-	-
Georgia	18	-	-	19	-	19	21	-	20	-	21	-	20	19	20	-	-	-
Florida	20	-	-	-	-	21	-	-	23	-	-	-	-	26	-	-	-	-
Kentucky	16	-	-	16	-	16	18	-	17	-	17	-	-	-	-	-	-	-
Tennessee	17	-	-	16	-	16	16	-	16	-	16	-	-	-	-	-	-	-
Alabama	16	-	-	16	18	17	18	-	19	-	17	-	17	17	17	-	-	-
Mississippi	18	-	-	17	-	15	20	-	17	-	16	-	18	17	18	-	-	-
Arkansas	15	-	-	14	-	15	14	-	15	-	16	-	14	15	16	-	-	-
Louisiana	17	-	-	17	-	19	17	-	18	-	20	-	18	22	22	-	-	-
Oklahoma	15	-	-	14	-	15	15	-	15	-	15	-	15	15	14	-	-	-
Texas	-	15	16	15	-	15	15	-	15	-	20	-	16	15	17	-	15	-
Montana	17	-	-	14	-	13	-	-	16	-	-	-	18	16	13	-	-	-
Idaho	15	-	-	-	-	-	-	-	-	-	-	-	14	13	14	-	-	-
Wyoming	16	-	-	16	-	19	20	-	15	-	-	-	-	-	-	-	-	-
Colorado	15	-	-	16	-	16	18	-	15	-	15	-	17	15	16	-	-	-
New Mexico	19	-	-	-	-	15	-	-	-	-	-	-	23	-	17	-	-	-
Arizona	-	-	-	24	-	-	-	-	23	-	-	-	21	-	23	-	-	-
Utah	14	-	-	-	-	-	-	-	14	-	16	-	17	-	-	-	-	-
Nevada	22	-	-	-	-	24	-	-	-	-	-	-	-	22	-	-	-	-
Washington	17	-	-	18	-	16	-	-	17	-	-	-	-	-	15	-	-	-
Oregon	17	-	-	17	-	16	-	-	-	-	-	-	18	17	-	-	-	-
California	22	-	-	23	-	23	21	-	22	21	24	-	-	22	-	-	-	-

EGGS — Average prices received by farmers for eggs, by crop reporting districts, 1925-1934 (Cents per dozen)

State	Crop reporting district																	
	1	1N	1S	2	2A	3	4	4A	5	5A	6	6A	7	8	9	9A	10	State
Maine	39	-	-	36	-	37	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41
New York	-	-	-	33	-	35	32	-	33	-	36	-	31	32	37	39	-	-
New Jersey	-	-	-	38	-	-	-	-	39	-	-	-	-	37	-	-	-	-
Pennsylvania	30	-	-	31	-	33	32	-	31	-	36	-	32	28	32	-	-	-
Ohio	26	-	-	26	-	30	25	-	25	-	27	-	27	26	26	-	-	-
Indiana	25	-	-	25	-	25	24	-	25	-	25	-	23	24	26	-	-	-
Illinois	25	-	-	-	-	29	23	23	25	-	25	23	24	-	23	-	-	-
Michigan	30	-	-	26	-	26	25	-	25	-	26	-	26	26	28	-	-	-
Wisconsin	24	-	-	25	-	26	23	-	24	-	25	-	24	25	28	-	-	-
Minnesota	22	-	-	25	-	30	22	-	22	-	24	-	22	22	23	-	-	-
Iowa	22	-	-	23	-	24	22	-	23	-	24	-	22	22	22	-	-	-
Missouri	21	-	-	22	-	22	22	-	22	-	23	-	21	22	23	-	-	-
North Dakota	22	-	-	22	-	22	21	-	21	-	22	-	21	22	21	-	-	-
South Dakota	22	-	-	21	-	21	22	-	22	-	21	-	22	20	21	-	-	-
Nebraska	22	-	-	20	-	21	-	-	20	-	21	-	20	20	20	-	-	-
Kansas	20	-	-	20	-	22	20	-	21	-	22	-	20	20	21	-	-	-
Delaware	-	-	-	36	-	-	-	-	31	-	-	-	-	30	-	-	-	-
Maryland	29	-	-	28	-	29	30	-	30	-	29	-	-	-	-	-	-	-
Virginia	-	-	-	27	-	-	27	-	26	-	27	-	25	27	27	-	-	-
West Virginia	28	-	-	28	-	27	27	-	26	-	27	-	-	33	-	-	-	-
North Carolina	25	-	-	29	-	27	27	-	28	-	27	-	-	28	27	-	-	-
South Carolina	29	-	-	29	-	27	29	-	28	-	-	-	-	26	-	-	-	-
Georgia	27	-	-	27	-	26	28	-	27	-	28	-	27	26	27	-	-	-
Florida	28	-	-	-	-	28	-	-	33	-	-	-	-	36	-	-	-	-
Kentucky	22	-	-	22	-	22	26	-	24	-	25	-	-	-	-	-	-	-
Tennessee	23	-	-	22	-	22	22	-	24	-	24	-	-	-	-	-	-	-
Alabama	23	-	-	23	26	24	25	-	25	-	26	-	25	24	25	-	-	-
Mississippi	28	-	-	22	-	19	28	-	23	-	23	-	24	24	25	-	-	-
Arkansas	20	-	-	20	-	23	21	-	23	-	25	-	22	24	25	-	-	-
Louisiana	27	-	-	25	-	27	24	-	23	-	25	-	22	26	26	-	-	-
Oklahoma	20	-	-	20	-	22	20	-	22	-	21	-	21	21	21	-	-	-
Texas	-	22	25	21	-	22	21	-	22	-	32	-	24	21	22	-	22	-
Montana	28	-	-	26	-	24	-	-	26	-	-	-	28	26	24	-	-	-
Idaho	26	-	-	-	-	-	-	-	-	-	-	-	23	22	24	-	-	-
Wyoming	28	-	-	26	-	29	31	-	24	-	-	-	-	-	-	-	-	-
Colorado	29	-	-	24	-	24	30	-	23	-	26	-	30	24	25	-	-	-
New Mexico	32	-	-	-	-	24	-	-	-	-	-	-	34	-	29	-	-	-
Arizona	-	-	-	37	-	-	-	-	30	-	-	-	29	-	33	-	-	-
Utah	24	-	-	-	-	-	-	-	23	-	26	-	27	-	-	-	-	-
Nevada	28	-	-	-	-	32	-	-	-	-	-	-	-	29	-	-	-	-
Washington	27	-	-	26	-	27	-	-	24	-	-	-	-	-	25	-	-	-
Oregon	25	-	-	26	-	27	-	-	-	-	-	-	26	27	-	-	-	-
California	28	-	-	29	-	29	27	-	25	26	29	-	-	29	-	-	-	-

THERE WILL BE MONEY —— IN POULTRY THIS YEAR

To Digest Clients~

Do not cut your baby chick orders for spring delivery. The drop in egg and broiler prices is an almost certain guarantee of profits later in the year.

THE PRICE OUTLOOK for eggs next fall is good. Egg prices will be back up to profitable levels by August. Broiler prices should improve from now until April or May.

BUY EARLY — The most profitable chicks this year will be those placed in your brooder before March 15. They hit the market just right.

PULLETS — Middle to late February pullets from a high producing strain should be in 60 per cent production by the end of August. Properly handled, such pullets usually go through the winter without a neck molt and hold a production rate of 60 per cent or better during the fall months when prices are high.

BROILERS AND COCKERELS started in February are ready to sell on the favorable early summer market.

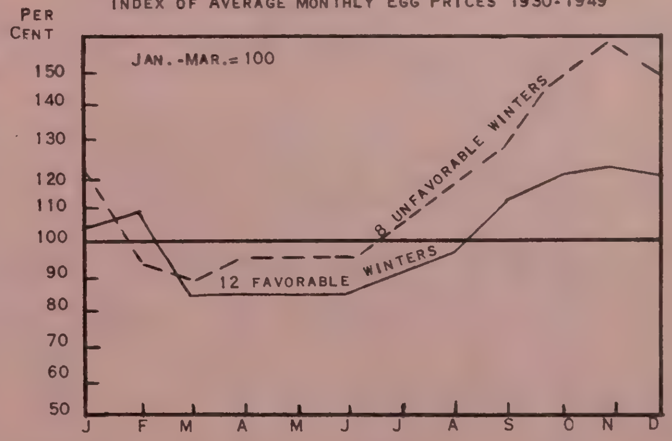
Many flock owners would be money ahead in 1950 if they --

☞ ① Sold part or all of their old laying hens now, and
② Put more of their efforts into getting pullets ready to fill the laying house again by next August.

Here is why:

EGG PRICES go up more in years following low winter prices than in years following high winter prices. In each of the last 20 years when winter profits were low, egg prices the next fall went up more than usual. (See the Graph.) Prices may not go as high in 1950 as they did last fall, but they will be profitable.

EGG PRICES FOLLOWING FAVORABLE AND UNFAVORABLE WINTER PRICES
INDEX OF AVERAGE MONTHLY EGG PRICES 1930-1949



Do Not Count on higher egg prices this spring. The government may come along with a new program that will help but you can't count on that. The important thing is to keep current production costs below current income. Keep a close eye on the average "Rate of Lay".

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DAILY FEED REQUIREMENTS FOR 100 HENS AND FEED COSTS PER DOZEN EGGS

PER CENT PRODUCTION	TOTAL* FEED INTAKE	FEED COSTS PER DOZ. EGGS DEC. 15, 1949			
		MID-WEST	MID-ATL.	SOUTHEAST	PACIFIC
10	18-19 LBS.	71	88	91	97
20	19-20	37	46	47	51
30	20-21	26	32	33	36
40	21-22	20	25	26	28
50	22-23	17	21	22	23
60	23-24	15	18	19	20
70	24-25	13	16	17	18

*BASED ON CORNELL UNIVERSITY FEED DATA AND COST OF POULTRY RATION BY AREAS AS REPORTED BY U.S.D.A.

The table shows daily feed requirements for 100 Leghorn hens at different rates of production. It also shows feed costs per dozen eggs in terms of feed prices in different sections of the country last December 15. Check your own feed costs against this table.

Keep your present layers as long as they pay their way on a production basis.

☞ But, CULL CLOSE. A hen that gets broody or for any reason does not lay her quota of eggs should go to market.

ALL-PULLET laying flocks are nearly always more profitable than all-hen or mixed hen and pullet flocks. The reason is that pullets lay an average of 50 more eggs per bird and they have a lower death rate. This year ☞ plan for an all-pullet laying flock.

☞ Don't try to cut costs by cutting the size of your baby chick orders this spring. Order at least 150 sexed or 300 mixed chicks for every 100 good pullets you want in the laying house this fall.

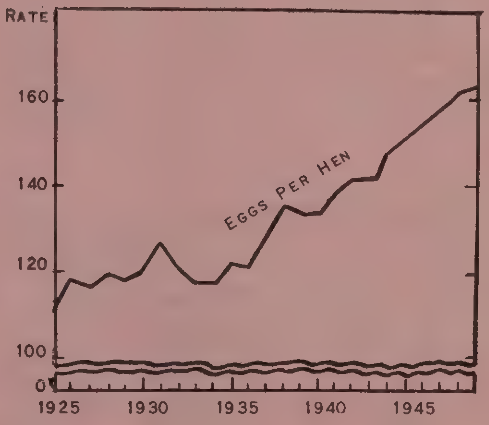
☞ If you have the facilities, order straight run chicks. Purdue University studies show that it costs about 9 cents more to produce pullets from sexed stock than from unsexed stock.

A GOOD BUY -- Today's pullet chicks are a better buy than those of 10 or 15 years ago because you buy more eggs with each chick.

When you figure this increased production back against feed, you find that the feed required to produce a dozen eggs has dropped from 10 pounds in 1935 to 7.9 in 1949.

BUY THE BEST -- An extra nickel paid for a quality chick usually comes back with a big dividend attached.

RATE OF LAY PER HEN, 1925-1949, U.S.



BROILER AND FRYER PRICES should start to improve soon. The normal thing is for a steady price rise from January to April or May. Before the war, the average advance from January to the spring peak was about 4 cents per pound. The price increase following years of low winter profits appears to be about twice this average rate.

☞ The stage is set for a similar but delayed price rise in 1950. Broiler areas took heavy orders of chicks until the end of December. Since then, we have received many reports of sharp cutbacks.

RESEARCH STAFF
Doane Agricultural Service, Inc.

THE 1954 POULTRY PICTURE

Record production, strong demand, efficient management will combine to make 1954 another profitable poultry year. With general farm prices dropping, ☞ the poultry industry is more than holding its own. Even with lower prices, the great strides in higher efficiency make poultry a better risk than many other farm enterprises. Stick with it.

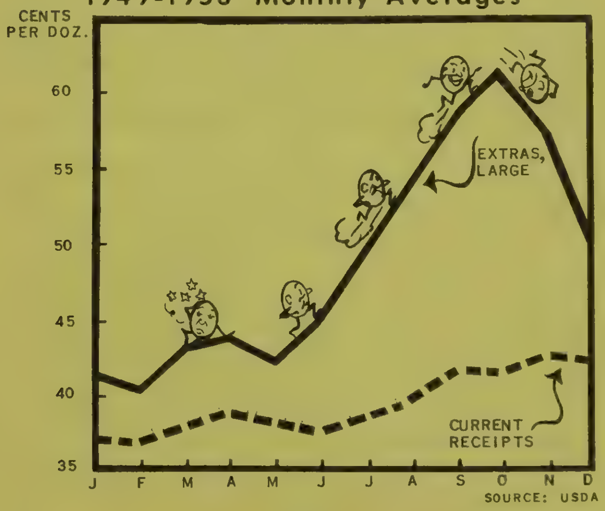
Here's how each major part of the poultry business shapes up for the new year:

Eggs will sell lower during the first half of 1954 than during the same period last year. Increased production has pulled prices down below the highs of a year earlier.

Record-high egg production will continue well above '53 through the first half of the year. Larger laying flocks and increased rate of lay assure this.

Demand will remain strong. No business bust is in sight. Growing population will have money to spend for poultry products. Cold storage stocks of eggs are very low. Breakers will soon enter the market to supply the demand for egg solids used in cake mixes and other foods. Prices won't slip low enough to wipe out profits.

CHICAGO EXTRAS, LARGE AND CURRENT RECEIPT EGG PRICES
1949-1953 Monthly Averages



SOURCE: USDA

Don't let present lower prices scare you out of placing your order for chicks now. To make money -- BUY EARLY.

Key dates for starting chicks -- JANUARY, FEBRUARY, MARCH. These birds will be in production in time to cash in on the high prices of late summer and early fall. Notice on the graph -- how fast the price of graded eggs drops after the middle of October.

When buying ☞ consider quality first and price second. Quality chicks mean chicks that come from healthy stock, free of disease; stock which has been bred for high egg production, livability, egg size, growth and fast feathering.

Hatching Egg producers can expect a reasonably profitable year. Expanding broiler production coupled with the prospects of increased flock replacements mean hatching eggs will be in good demand. Make your contracts early and strive to produce a quality product. Only top quality hatching eggs will command the premiums necessary for good profits.

Turkey Outlook at this time is mixed. 1953 was a more profitable year than expected earlier. Early indications point to a big crop in 1954. A survey conducted by the National Turkey Federation indicates that the number of small birds blood-tested for inclusion in breeding flocks may be 28 percent above the previous year. About two percent less heavy birds will be tested.

If these intentions are carried out, the '54 turkey crop is likely to exceed the record of 60.5 million turkeys raised in 1952. However, with an increase coming in the lighter breeds -- the total pounds of meat produced could be less.

Broiler Growing is becoming a less speculative business. Production is leveling out, now a year-round proposition. No longer are broilermen growing all their birds during one part of the year with the idea of hitting a high market and making a killing. Today they grow 3 or 4 lots of birds per year, thus spreading out the risk. True, the chances for getting rich quick are reduced. But the chances for large losses are also less. And the business, in general, is steadier and sounder.

Steady prices close to '53 levels are in prospect for broilers. Production will run about 5 percent higher. However growing population and greater consumption will absorb the increased production and prevent any severe price drop.

Facts and opinions from the nation's oldest and largest farm management, rural appraising and agricultural research service. All statements based on factual information believed accurate but not guaranteed.
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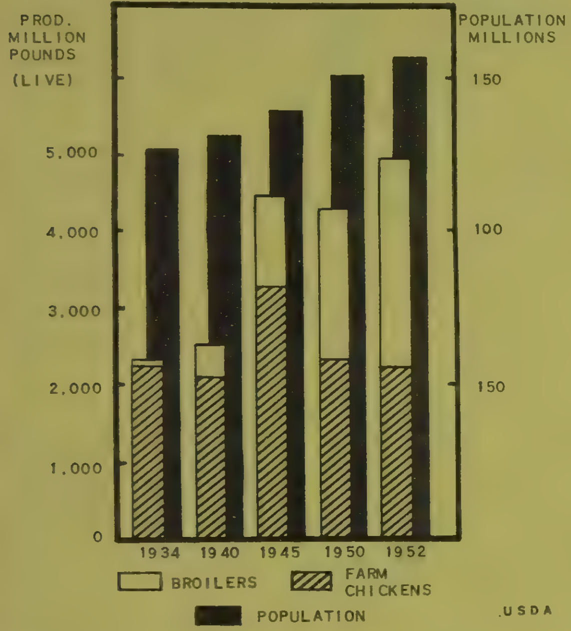
THE 1954 POULTRY PICTURE

Poultry meat production is hardly keeping up with increased consumption and the growing population. Number of farm chickens is on the decline. Each year more farmers realize that farm grown cockerels cannot compete with the commercial broiler.

LIVE POULTRY MEAT PRODUCTION
COMPARED WITH U.S. POPULATION



Costs in 1954 will average lower than the past year. The labor situation is easing slightly. Machinery and equipment costs will run about the same, but price concessions and trade-in allowances should be more liberal.

Feed, the big item, will cost slightly less this year. Prices may strengthen seasonally during the winter, but will not get as high as during the past several feeding seasons.

WHEN CHICKS ARRIVE

Have brooder house and equipment thoroughly cleaned and disinfected. Have house at the proper temperature (approximately 95°) several hours before chicks are brought in. An easy way to tell if the temperature is right is to watch the chicks. When they huddle together under the hover it is too cold. If chicks spread out along the walls it is too hot.

Start your future layers right by having plenty of fresh feed and water before them at all times. Use a good feed; either commercial or home-mixed. When mixing your own feed, use a formula recommended by agricultural colleges in your area. Watch chicks closely for signs of disease. When identified early, many poultry diseases can be checked quickly with very little damage to the flock.

If a disease outbreak does occur, an accurate diagnosis is necessary. Don't depend on the word of the would-be chicken doctor next door. Have diseased birds checked by the state disease laboratory or a veterinarian. Vaccination is effective in preventing some infections. But it is not recommended unless a specific disease for which the vaccination is effective is known to exist on your premises or in the community.

LOOK AHEAD

While growing your new crop of layers, be thinking about where you market the eggs they produce. If you are not selling your eggs on a graded basis -- start now to get on such a market. The premiums paid for high quality eggs on a graded market offset by far the little extra care needed to produce such a product.

If a quality egg market is not available to you, talk to your hatcheryman, feed dealer and county agent to see what can be worked out. Many buyers would be glad to purchase on a graded basis if the producers would only cooperate.

It takes volume for a buyer to carry out such an operation. The majority of the producers within a local area must sell graded eggs if the program is to be successful. An improved egg market is practically a community program.

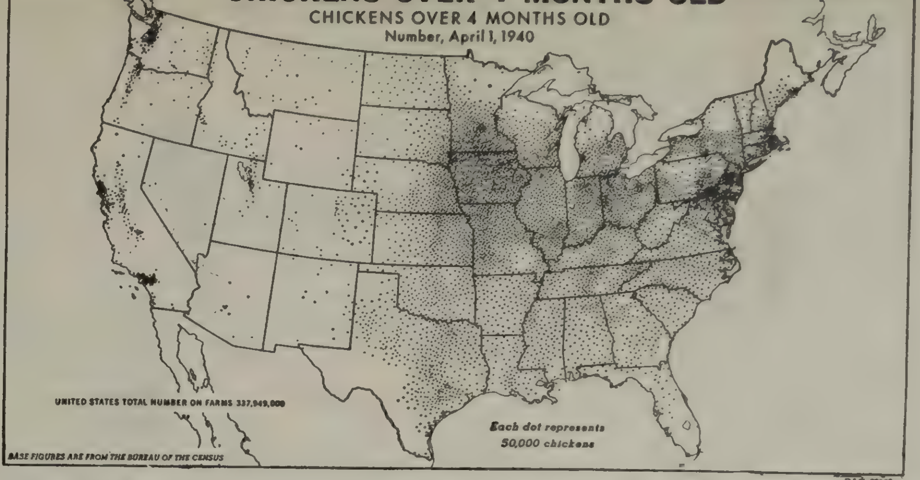
A Sideline Enterprise that fits in well with the setup on many egg farms is capon raising. Frequently a flock of capons can be worked into the brooding schedule, using housing and equipment which would otherwise be idle.

The capon market has been fairly good the past several years. However, it is a seasonal market with best prices coming at the holidays -- Christmas, Thanksgiving and Easter. The capon market is generally poor during the warmer months (May through September) and this marketing period should be avoided.

The best weight at which to market capons is between 7 and 8 pounds, live weight. Flock averages over 8 pounds are usually not economical. You should figure on about a 20-week growing period to reach this desired weight. Average cost of producing a capon, exclusive of labor cost, is about 30 cents per pound.

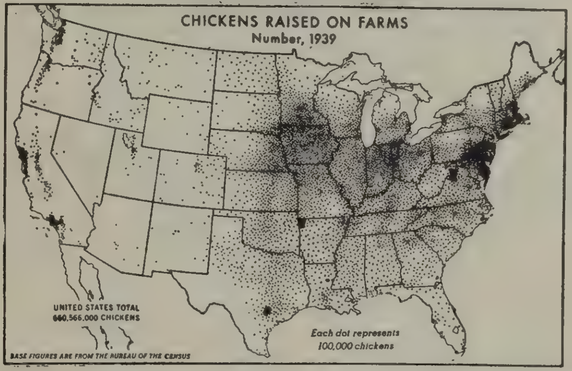
POULTRY FACTS

CHICKENS OVER 4 MONTHS OLD


CHICKENS OVER 4 MONTHS OLD
Number, April 1, 1940
UNITED STATES TOTAL NUMBER ON FARMS 337,949,000
Each dot represents
50,000 chickens
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS
BAE 38928

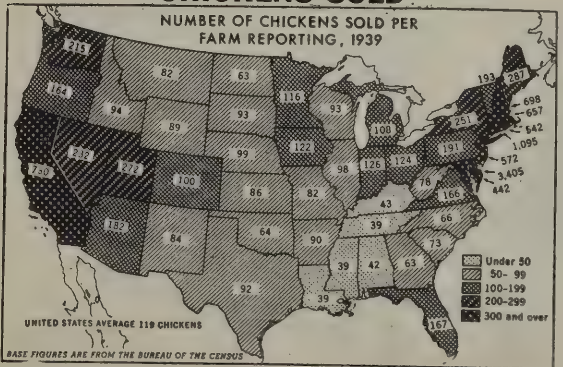
In the Corn Belt and around its margin where feed is cheap are located nearly half the chickens in the United States. There are 3 distinct areas—Sonoma and Los Angeles Counties of California in the Western States, and the area in southeastern Pennsylvania and adjacent New Jersey—where the numbers of chickens per county are the heaviest in the country. On April 1, 1940, there were more than 3,000,000 chickens in Sonoma County, Calif., mostly in the Petaluma district, and about 1,700,000 in Los Angles County. San Bernardino County, Calif., had 900,000; in Pennsylvania, York and Lancaster Counties each had about 1,300,000, Berks County 636,000, and Bucks County 733,000; in New Jersey 5 counties had from 400,000 to 700,000 each.

CHICKENS RAISED



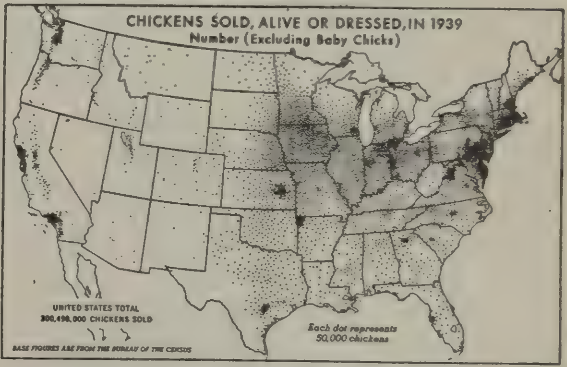
The most notable areas where chickens were raised on farms in 1939 were in southeastern Pennsylvania, southern New Jersey, the Delmar peninsula; Rockingham County, Va.; Benton and Washington Counties, Ark.; Gonzales County, Tex.; Los Angeles, Sonoma, and San Bernardino Counties, Calif.; and in the relatively dense counties throughout the Corn Belt. The number of chickens raised on farms in 1939 were nearly twice as many as the number of chickens more than 4 months old on farms April 1, 1940.

CHICKENS SOLD



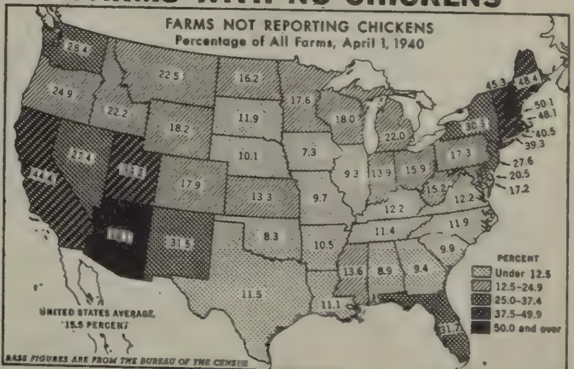
The number of chickens sold per farm reporting from Delaware was 3,405; from Connecticut, 1,095; from California, 730; and from 5 other States along the northeastern Atlantic seaboard the number of chickens sold ranged from 442 to 698 per farm reporting in 1939. Large numbers of chickens sold per farm in States like Nevada, Utah, and Washington do not reflect the total sales but merely signify larger farm flocks.

CHICKENS SOLD


CHICKENS SOLD, ALIVE OR DRESSED, IN 1939
Number (Excluding Baby Chicks)
UNITED STATES TOTAL
300,496,000 CHICKENS SOLD
Each dot represents
50,000 chickens
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS
BAE 42613

In 1929 about 42 percent of the chickens raised on farms were sold alive or dressed (excluding baby chicks), whereas in 1939 nearly 46 percent of the chickens raised were sold. The most prominent areas are along the Atlantic seaboard north of the Potomac River; Rockingham and Shenandoah Counties, Va.; Benton and Washington Counties, Arkansas; Gonzales County, Tex.; and in Sonoma, Los Angeles, and San Bernardino Counties, Calif. Sales throughout the Corn Belt were also heavy with dense areas around cities.

FARMS WITH NO CHICKENS

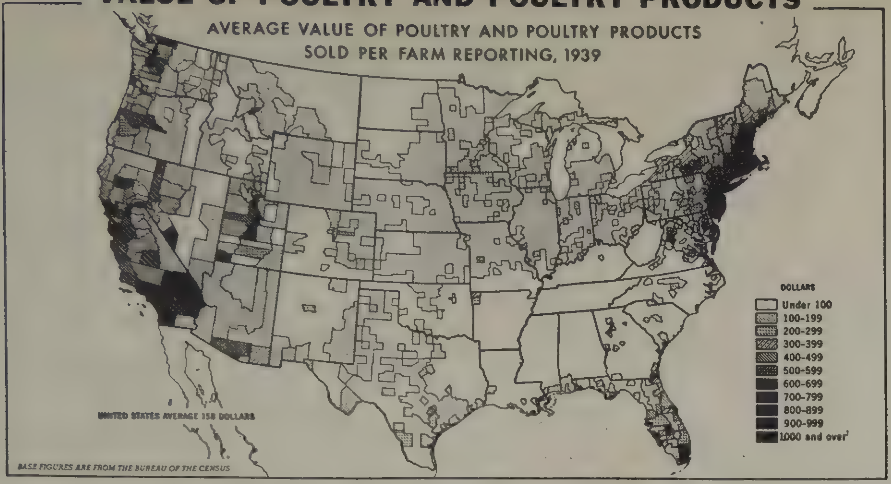


In Arizona 56.1 percent of the farms were reported as not having chickens. Arizona, however, had very few farms, and reported about 500,000 chickens more than 4 months old on farms April 1, 1940. Iowa, having many farms, reported only 7.3 percent of them as not having chickens. The 93 percent of Iowa farms reporting chickens had nearly 27,000,000.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

POULTRY FACTS

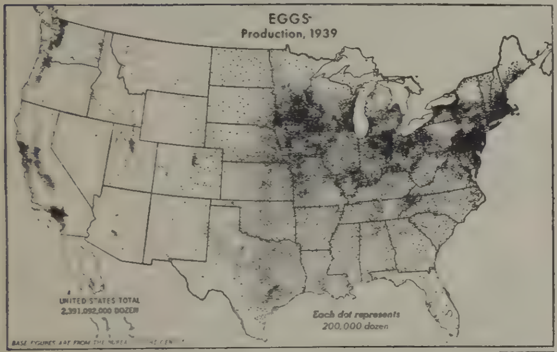
VALUE OF POULTRY AND POULTRY PRODUCTS


AVERAGE VALUE OF POULTRY AND POULTRY PRODUCTS
SOLD PER FARM REPORTING, 1939
DOLLARS
Under 100
100-199
200-299
300-399
400-499
500-599
600-699
700-799
800-899
900-999
1000 and over
UNITED STATES AVERAGE 158 DOLLARS
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 42998

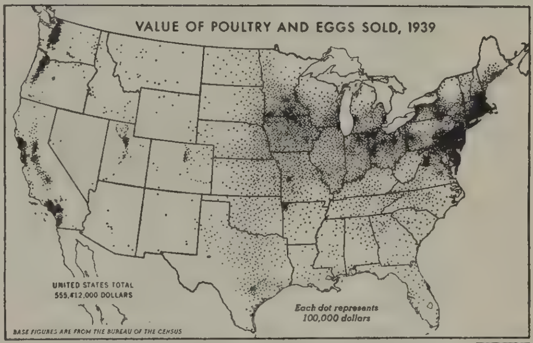
The highest values of sales of poultry and poultry products per farm were in the northeastern industrial seaboard area, and in California, Utah, and southern Florida. The value of sales per farm was high in California where farm flocks are large. California reported the largest amount from sales of poultry and poultry products, Pennsylvania was second, and Iowa third. However, Iowa receipts per farm on this map are very low, because of the many farms with small flocks. Throughout the Southeastern States, except Florida, very few counties showed sales per farm of more than $100, because most of the farms had small flocks. The extent of black areas in California is due to the large counties in the southern part of the State, some of which are as large or larger than Delaware, Rhode Island, Connecticut, Massachusetts, or New Hampshire.

EGGS



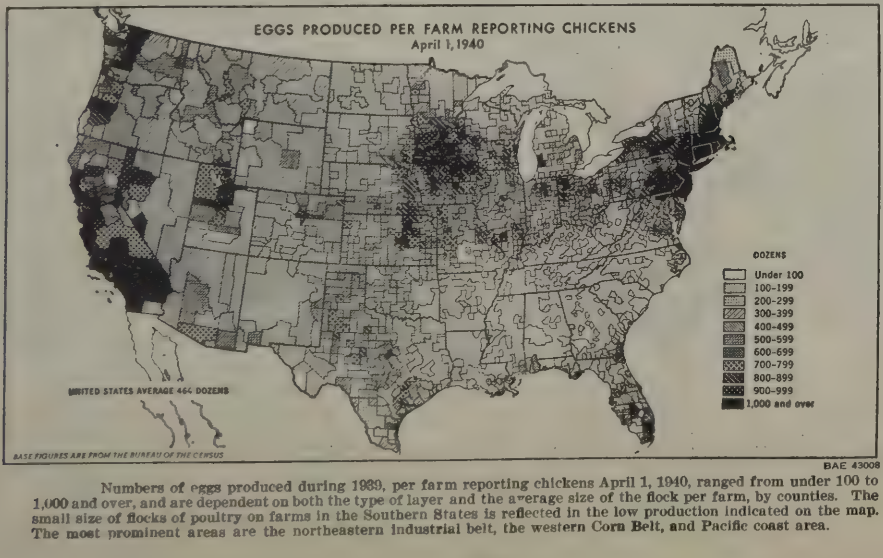
Egg production is scattered throughout the United States, but is more concentrated in the Corn and Dairy Belts, southeastern Pennsylvania, New Jersey, Connecticut, Rhode Island, eastern Massachusetts, southern New Hampshire, western New York, and the Pacific Coast States than elsewhere. Dense areas of production are found also in the black prairie area of southern Texas, the Colorado Piedmont north of Denver, and around Ogden and Salt Lake City, Utah. The average number of eggs per hen is largest in the Western States and smallest in the Southern States.

VALUE OF POULTRY AND EGGS SOLD


VALUE OF POULTRY AND EGGS SOLD, 1939
UNITED STATES TOTAL
555,412,000 DOLLARS
Each dot represents
100,000 dollars
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

Receipts from sales of poultry and eggs in 1939 were heaviest along the eastern seaboard north of the Potomac River and extending as far as New Hampshire. In this area are many large cities and industrial areas practically adjacent to one another. The largest value—more than $40,000,000—was reported from California. Pennsylvania sales amounted to more than $36,000,000, and Iowa sales to nearly $34,000,000.

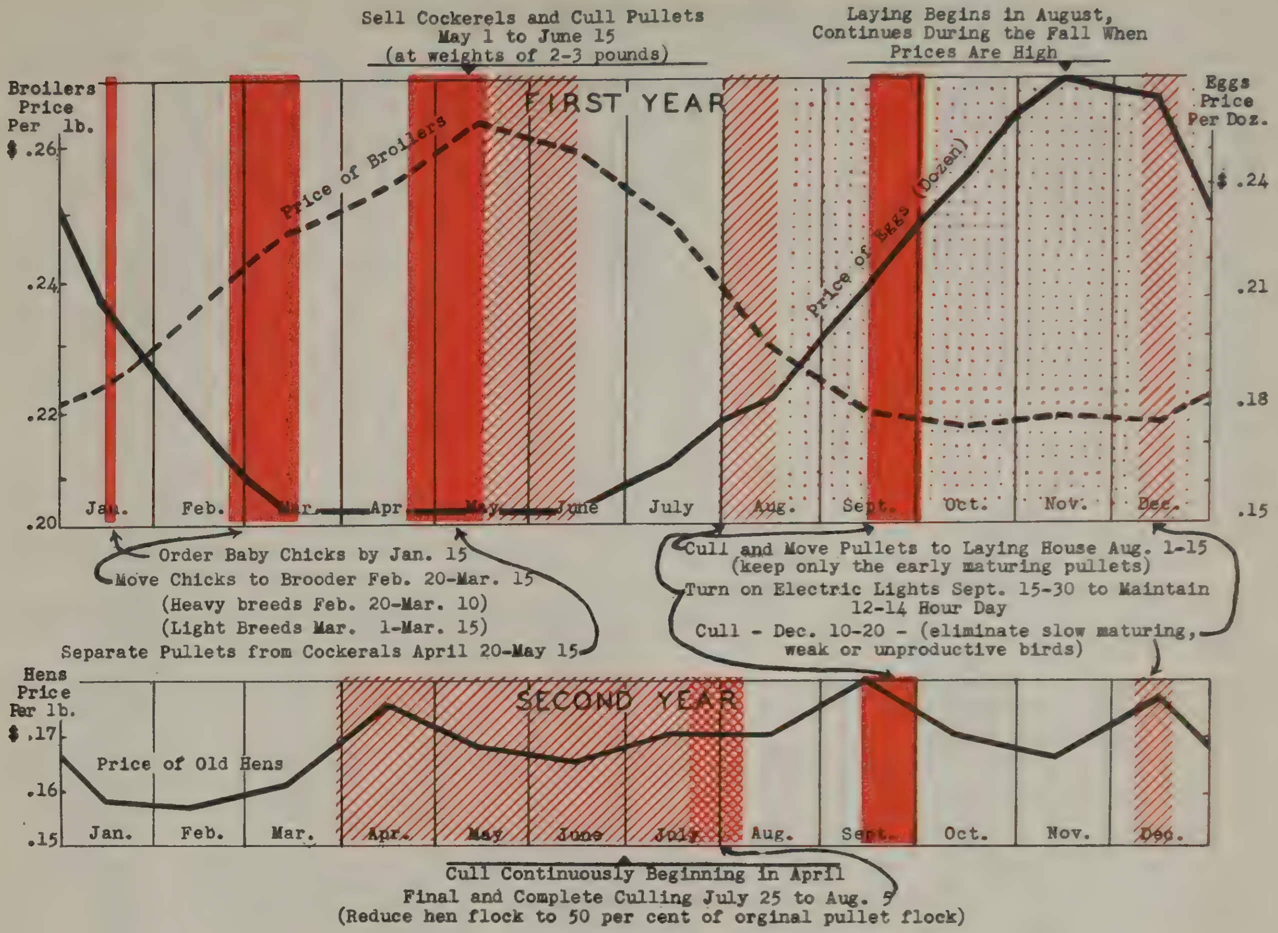
EGGS PRODUCED


EGGS PRODUCED PER FARM REPORTING CHICKENS
April 1, 1940
DOZENS
Under 100
100-199
200-299
300-399
400-499
500-599
600-699
700-799
800-899
900-999
1,000 and over
UNITED STATES AVERAGE 464 DOZENS
BASE FIGURES ARE FROM THE BUREAU OF THE CENSUS

BAE 43008

Numbers of eggs produced during 1939, per farm reporting chickens April 1, 1940, ranged from under 100 to 1,000 and over, and are dependent on both the type of layer and the average size of the flock per farm, by counties. The small size of flocks of poultry on farms in the Southern States is reflected in the low production indicated on the map. The most prominent areas are the northeastern industrial belt, the western Corn Belt, and Pacific coast area.

DOANE POULTRY SYSTEM



Sell Cockerels and Cull Pullets
May 1 to June 15
(at weights of 2-3 pounds)

Laying Begins in August,
Continues During the Fall When
Prices Are High

Order Baby Chicks by Jan. 15
Move Chicks to Brooder Feb. 20-Mar. 15
(Heavy breeds Feb. 20-Mar. 10)
(Light Breeds Mar. 1-Mar. 15)
Separate Pullets from Cockerels April 20-May 15

Cull and Move Pullets to Laying House Aug. 1-15
(keep only the early maturing pullets)
Turn on Electric Lights Sept. 15-30 to Maintain
12-14 Hour Day
Cull - Dec. 10-20 - (eliminate slow maturing, weak or unproductive birds)

Cull Continuously Beginning in April
Final and Complete Culling July 25 to Aug. 5
(Reduce hen flock to 50 per cent of orginal pullet flock)

D.A.S. POULTRY SYSTEM

The D.A.S. poultry system is a practical plan for handling laying flocks of 200 to 500 hens. The principles of this system also apply to flocks of less than 200 hens and small home flocks of 20 to 50 hens, but such units are usually less efficient in their use of labor and equipment.

Careful timing of all operations and strict adherence to sanitary standards are essential for maximum profits. Every step from the time the chicks are ordered until they are finally sold from the farm must be observed or the entire system will get out of balance. Good managers will be continually alert to detect the first signs of disease or any other factor which may upset the program.

Start with one and one-half pullet chicks for every pullet wanted in the laying house. This will allow for normal losses and permit rigid culling. It means that for every 100 pullets saved each year it is necessary to start 300 unsexed or 150 sexed chicks. Sexed pullets are not recommended unless brooding facilities or labor are too limited to handle unsexed chicks. It costs about 9 cents* per head more to produce pullets from sexed stock than from unsexed stock.

A laying flock composed of hens and pullets, housed seperately, in a ratio of 1 hen to 2 pullets constitutes the most satisfactory farm flock under average conditions. The actual number of hens carried over will depend on the health of the flock and the facilities available. Usually not more than 50 per cent of the old hens can be economically carried into their second year.

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*Purdue University

House old hens and pullets seperately to check the spread of disease. The available laying house facilities should be divided 1/3 to the old hens and 2/3 to the pullets. If this cannot be done all of the old hens should be sold before the pullets are put in the laying house. One large laying house divided into two seperate units by a solid wall constitutes the minimum standard for segregating old hens from pullets. Entirely seperate buildings are preferred.

POULTRY FEED REQUIREMENTS

7 pounds of feed will produce a 2-pound broiler in 8 weeks.

25 pounds of feed will produce a 3 1/2 - pound pullet in 6 months.

90 pounds of feed per year are required by a hen producing 200 eggs in a year.

DAILY FEED REQUIREMENTS FOR 100 HENS

Per Cent Production	*Total Feed Intake*
0	18-19 pounds
10	19-20 "
20	20-21 "
30	21-22 "
40	22-23 "
50	23-24 "
60	24-25 "
70	25-26 "

Cornell University

This table shows the total amount of feed required by 100 Leghorn hens per day. Heavier breeds will require more.

DOANE POULTRY SYSTEM

10 POINTS FOR PROFIT

1. **SANITATION** — Make it your first consideration in the poultry program.

   Confine Baby Chicks to the brooder house and sun porch until they are moved to range as pullets or sold as cockerels.

   Grow Pullets on clean range which has had no chickens on it for at least two years.

   Confine Laying Hens to the laying house and sanitary porch. House old hens and pullets separately.

2. **TIMING** — Make timing of the various steps in the poultry program your second consideration. Follow the outline on top of page 253 so cockerels can be sold in the high spring market and so pullets will be in full production while egg prices are high in the fall.

3. **BROODER HOUSE AND EQUIPMENT**—Prepare the brooder house at least a week in advance. Scrape, sweep and then scrub the floor with lye water. Spray the interior with a good disinfectant. Let the house dry; then spread clean, fine litter, such as cut straw, over the floor to a depth of about one inch. Start the electric brooder or stove at least 48 hours before the chicks arrive so that operations can be checked and so the litter will become warm and dry. If possible use electric brooders - save time, steps and reduce the fire hazard.

   Do not crowd the facilities used. Allow one square foot of floor space for every 2½ chicks placed in the brooder house. In cold climates, provide at least 11 to 12 square inches of hover space under electric brooders and 7 to 9 square inches under coal or oil brooders.

4. **BABY CHICKS** — Buy chicks from high-producing, disease-free flocks and from hatcheries giving special attention to keeping pullorum and other infectious diseases to a minimum.

   Place feed and warm water before chicks as soon as they arrive. Give them close attention during the first week until they learn to eat, drink, and brood properly. Maintain a hover temperature of 95 to 100 degrees Fahrenheit the first few days and then reduce it gradually 3 to 5 degrees per week until it is no longer needed. The action of the chicks is the best guide to proper brooder temperature - so long as chicks are active and eating properly they are comfortable.

5. **PULLETS AND COCKERELS** — Separate the pullets from the cockerels when they are 8 to 10 weeks old and move them to clean range. Keep the cockerels confined so they can be fattened for the market rapidly. Feed grain and mash free-choice to all growing birds. See feeding instructions under "How to Feed."

6. **LAYING HOUSE** — Clean the laying house thoroughly and disinfect completely before the pullets are moved in during the first half of August. Fill the laying house to capacity.

   These are minimum standards:
   - Floor space - 3 1/2 sq. ft. per heavy breed hen.
     3 sq. ft. per light breed hen.
   - Roost space - 7 to 10 inches per hen.
   - Windows - one sq. ft. for each 15-20 sq. ft. of floor space.
   - Feeding space - 4 to 5 inches per hen.
   - Nests - one for each 5 to 6 hens.

7. **ELECTRIC LIGHTS** — Start electric lights between September 15 and September 30. Maintain a 12 to 14-hour day throughout the winter. Use 50-watt lights with reflectors. Place them above the feeding and watering equipment at a height of 6 feet above the floor. Space lights 10 feet apart and be sure they shine directly on the roost space. Dimmers are not necessary if morning lights are used.

8. **CULLING** — Adopt a regular program of culling. Follow the outline on top of page 253. (See also Digest page 255).

9. **FEEDING** — Use the FREE-CHOICE METHOD of FEEDING and base the entire poultry feeding program on ONE Mash Feed Mixture. Successful free-choice feeding of poultry depends on keeping feed available in the feed hopper at all times. This should be started while the chicks are small or at latest when the pullets separated from the cockerels. Old hens which are accustomed to another system of feeding cannot be successfully changed to this system.

   A good mash is one which contains proteins from both animal and plant sources and which is fortified with vitamins and minerals. No one mash feed mixture is best for all conditions. When mash and grain are fed free choice chickens will adjust their feed intake to any good mash containing 16 to 32 per cent protein but the higher percentages are preferred.

26 PER CENT PROTEIN MASH FORMULAS FOR HOME MIXING

Ohio State University

Ground corn	13 lbs.	9 lbs.
Wheat middlings or ground wheat	10 "	24 "
Wheat bran or ground wheat	10 "	11 "
Ground oats or ground barley	10 "	10 "
Dehydrated alfalfa leaf meal or special alfalfa meal	10 "	10 "
Meat scraps or fish meal or both	15 "	24 "
Dried buttermilk or dried skimmilk	10 "	10 "
Soybean oil meal or corn gluten meal or both	17 "	0 "
Ground limestone or ground oyster shells	2 "	0 "
Bone meal	1 "	0 "
Salt	1 "	1 "
Fish oil (300 units vitamin D to gram)	1 "	1 "

Operators who do not grow their own feed or are not equipped with feed grinding and mixing equipment will usually find it more efficient to buy good commercially mixed feeds having these necessary ingredients.

HOW TO FEED

The feeding program outlined here is based on the free choice feeding of a 26 per cent mash and farm grain in separate compartments of the feeder.

BABY CHICKS-

First Week - feed straight mash with water to drink, or feed a mixture of 1/2 mash and 1/2 corn meal with milk to drink.

After First Week - feed mash and ground corn, ground oats, and ground wheat free choice in separate compartments in the feed hopper. Keep clean water, ground oyster shells or limestone and hard grit available at all times.

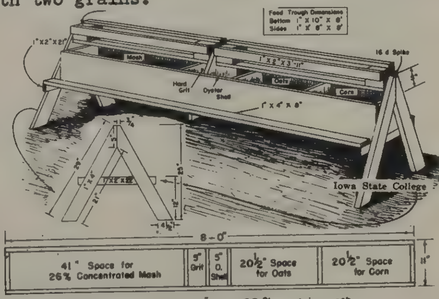
LARGER CHICKS-

When large enough to eat coarse feed, replace the ground grain with cracked and later whole grains. Provide at least two of the following grains at all times - corn, oats, wheat, barley, rye, kafir or millet.

PULLETS, COCKERELS AND LAYING HENS-

Free-choice feeding makes it unnecessary to change the feeding ration as the birds mature. When shifts become necessary make the change gradually by mixing the new feed in the hopper with the old feed.

The illustration below suggests the proper construction of hopper space for feeding a 26 per cent mash with two grains.



Construction of the feeder when using a 26 % protein mash

10. **FLOCK MANAGEMENT**-Remove sickly or diseased layers promptly. Pullets that become fat and coarse are of doubtful value and should be sold. Keep dogs, cats, and visitors out of the house. A sudden fright can cause hens to stop laying and go into a moult.

    Produce infertile eggs for the market. All male birds should be sold unless eggs are being produced for hatchery purposes. Gather eggs twice a day to prevent them from heating, freezing or becoming soiled or broken. Store eggs in a cool place until sold. Market eggs often - once a week in winter and three times a week in summer. Sell graded eggs if you have a market outlet that will pay a premium for quality.

SELECTING PROFITABLE LAYERS

CHARACTERISTICS ASSOCIATED WITH LAYING

Parts of body to be observed	Good layers	Poor layers
1. Back	1. Long, wide	1. Short, narrow
2. Body	2. Long, wide, deep	2. Short, narrow, shallow
3. Vent	3. Large, moist	3. Small, dry
4. Beak	4. White	4. Yellow
5. Shanks	5. White, thin, flat	5. Yellow, plump, round
6. Health	6. Vigorous a. Active b. Well fleshed c. Alert	6. Not vigorous a. Inactive b. Underweight c. Drowsy
7. Plumage	7. Worn, ragged	7. Bright, glossy, clean, not worn
8. Pelvic bones	8. Thin, straight, pliable	8. Thick, curved in
9. Keel (breast) bone	9. Slopes downward	9. Slopes upward
10. Skin	10. Soft, pliable, loose	10. Hard, dry, tight
11. Fat	11. Good flesh, not excess fat	11. Excess fat under skin on body and especially around abdomen
12. Feathering	12. Close, tight	12. Loose, fluffy
13. Molting	13. Late	13. Early
14. Comb	14. Large, red, plump	14. Small, scaly, schriveled
15. Head	15. Feminine, refined	15. Masculine, beefy

Note: Breeds not having yellow pigment cannot be scored on pigmentation.

Yellow Pigment Changes.* Laying Time Required to Lose or Gain Yellow Pigment

Part of Hen	Approximate Laying time to Lose	Approximate Vacation time to Gain
Vent	0–3 days	0–1 day
Eye ring	5–7 days	3–5 days
Beak and Ear Lobes**	4–6 weeks	10–14 days
Shanks	5–7 months	4–8 weeks

Groups of Batches of Feathers Shed	Relation of Molt of Primary Wing Feathers to Vacations from Laying
	Vacation
1	Usually 2 weeks (sometimes none)
2	" 4 weeks
3	" 6 weeks
4	" 8 weeks

*Does not apply to naturally white-skinned breeds or birds not fed green feed or yellow corn.
**Applies to white ear lobed breeds

Characteristics of a High-Laying Strain

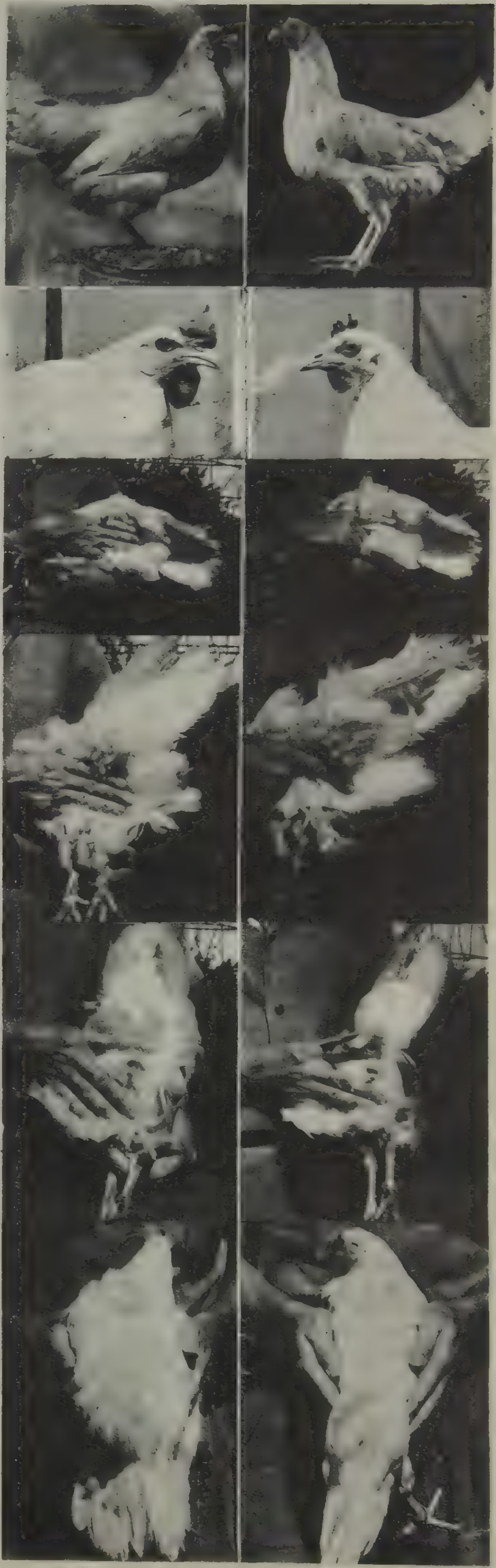
Time of Maturity	Laying begins at about six months of age in the case of Leghorns and at about seven months in the case of Rhode Island Reds, Plymouth Rocks, and similar breeds.
Rate of production	Average of 180 or more eggs a year.
Broodiness	Birds are seldom broody.
Persistence of production	Hens are laying well in August and September toward the end of the first laying year or after it is completed.

Summer Best for Culling

Some culling should be done throughout the year, but there are certain times that are better than others for determining the good and the poor layers. Hens that stop laying and take a prolonged rest and hens that become weak or physically unfit should be removed from the flock as soon as noticed. For a thorough, systematic culling of the flock, July, August and September are probably the best months.

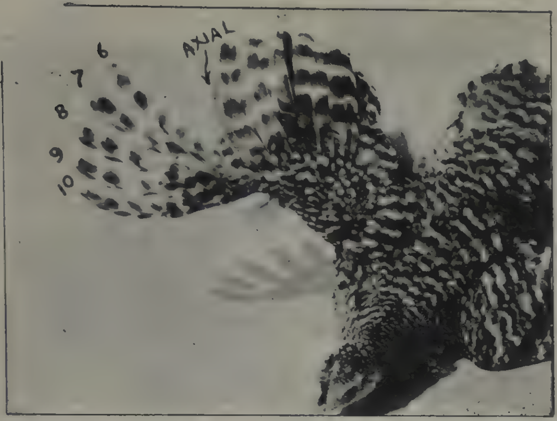
Sources; Univ. of Georgia, Bul, #341; Miss. State College, Extension Cir. #116; Mich. St. College Ext. Bulletin #221 U.S.D.A. Farmers Bulletin #1727.

THE GOOD LAYER　　THE POOR LAYER

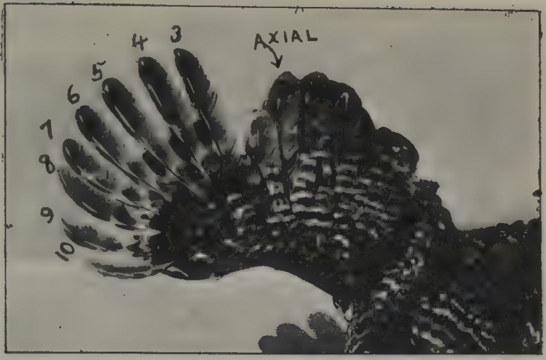


DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

SELECTING PROFITABLE LAYERS



Wing of a fast molter. Five primaries have been shed at about the same time. At this rate wing molt will be completed in eight weeks.



Wing of a slow molter. Axial feather marked. This hen is dropping one primary feather every two weeks. First feather next to the axial is about one-half grown. The second primary has just been dropped and eight primaries remain to be shed. This will require 24 weeks to complete wing molt

THE MOLT

The molt of the primary wing feathers has been studied in detail inasmuch as it occurs somewhat gradually and may be taken as a moderate indication of vacations. The primary feathers are shed in a definite order beginning on the inside next to the axial or thumb feather, as illustrated. A hen may drop one or more feathers at one time but each time feathers are dropped, it indicates a vacation of about two weeks. The number of vacations can be estimated by the number of groups of new feathers of different lengths growing in. The approximate time the vacation began can be estimated from the length of the first group of new feathers. One or more fully developed new feathers indicate a vacation which may have started at least six weeks previously because 6 weeks' time is required to grow new feathers.

PIGMENTATION

With breeds which normally have yellow skin the amount of vacation may be estimated by the extent of the return of yellow pigment after a period of several months of laying. The length of the vacation time required for the return of yellow pigment is indicated on page 255.

The yellow pigment comes from green feed and yellow corn. If a pullet is grown on range where there is plenty of green feed and yellow corn she should have yellow skin, beak and shanks. As soon as the ovary of the pullet begins to produce yolks virtually all of the yellow pigment in the feed is diverted to the ovary and egg yolks. As a result, the pigment in the skin, beak and shanks wears off or fades out in time. It fades faster in some regions than in others but by the end of five to seven months of laying, the yellow pigment will disappear from the thick scales of the shank. The fading takes place in a definite order, i.e. vent, eye ring, ear lobe, beak and shanks. When a vacation occurs the pigment in the feed is again returned to the regions mentioned, and in the same order but at a much faster rate. For the estimated time of pigment change,(Page 255) It should be remembered that the pigment will fade from the hen if a supply is not present in the feed regardless of laying and it will not return when a vacation occurs, unless it is present in the feed.

SUMMARY

One of the most reliable systems of selection or culling of hens for egg production is based on the practice of giving the hens the best feed, care and opportunity to lay and choosing the ones which lay the greater part of the year.

To make a good egg record, a hen should *mature early* as a pullet, have no *winter vacations,* no *broody vacations,* and good *persistence*—that is, to continue laying late in the fall. Breeding from hens which have those qualities will improve the productivity of the flock. The ability to distinguish hens in production from those which are not, is easy to acquire. The principal changes which take place when a hen takes a vacation from egg production are: (1) a shrinkage of comb and of the abdomen, (2) reduced pubic bone and pubic bone-keel spread, (3) return of yellow pigment, and (4) molt. Observations of pullets and hens for these signs of production and vacations made quarterly, will provide a reliable, practical measure of a hen's laying ability.

Hens may be retained in the flock for as many years as they continue to meet the requirements. It may be expected that hens will decline in annual egg production at the rate of 12 to 20 per cent per year, depending on whether they are a small or large breed of hen.

Unhealthy hens should be discarded as soon as detected.

SELECTION OF MALES

The best method of selecting males for breeding purposes is to choose those which are pedigreed from ancestors with progeny of known production performance. For flocks where such records are not kept it is advisable to buy males from specialized breeders who maintain production and pedigree records. It is a good plan to choose birds from ancestors whose female progeny are known to (1) mature early (i.e. in less than 210 days), (2) have no winter pause, (3) be non-broody, (4) have a persistence of more than 11 months, (5) have a rate of production of at least 20 eggs per month, (6) lay eggs which weigh more than 2 ounces, have good shell color, and a record of high hatching power. In addition the progeny should have a low mortality

A SCHEDULE FOR SYSTEMATIC CULLING

Baby chicks intended for the laying flock should be hatched from eggs of known high producing strains.

Mark the chicks when one day old by cutting a slit in the web of one foot. Each year mark a different web and the age of a hen can be told by noting which web is marked.

FIRST CULLING in November (or about 2 months after first pullets begin to lay)

Cull out and sell the slow maturing pullets (maturity varies from 6 months for light breeds to 7 months for heavy breeds). Band pullets which are already in production and meet the requirements of a good layer (see tables page 255) with a red leg band.

Do not crowd the laying house. Allow 2.5 square feet of floor space for each bird.

SECOND CULLING in January or February

Cull for present production and rate of production, band good layers with a white leg band and sell all non-layers.

THIRD CULLING in June, July or August.

Cull for persistance in production and for present production. Band good layers with a blue leg band. The best hens will now carry red, white and blue leg bands.

Sell the non-layers and enough second choice or old hens to reduce the flock one half or more. It is usually considered good practice to replace 50-60 per cent of the laying flock with early pullets each year.

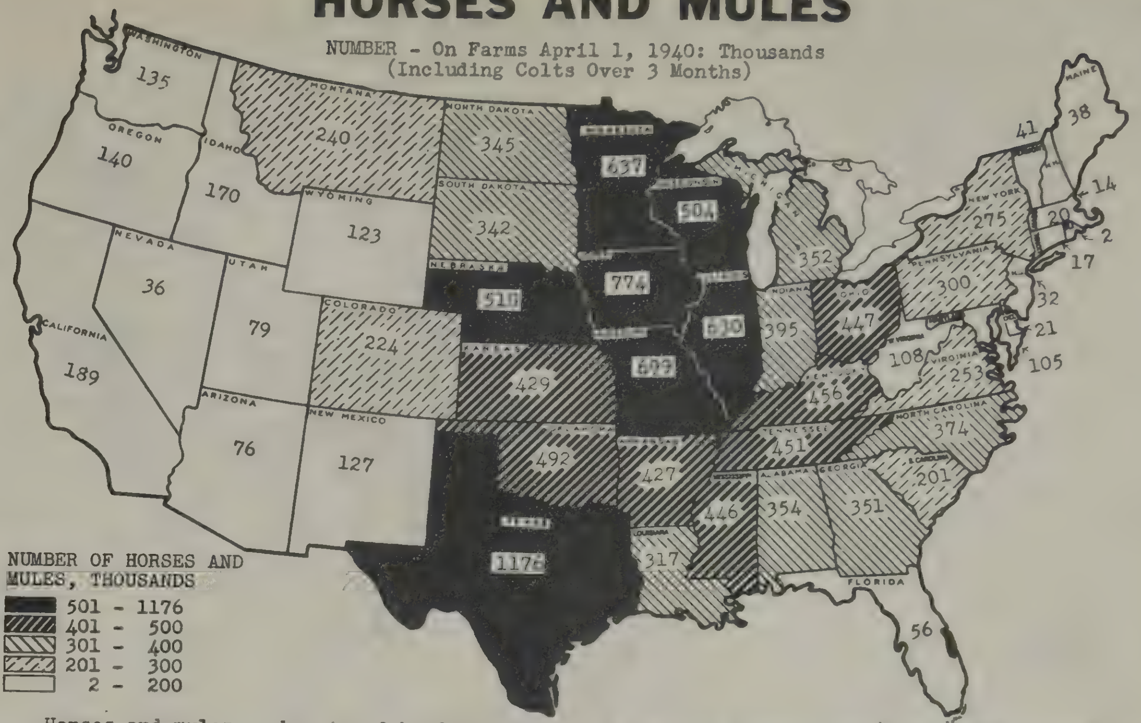
Hens vs. Pullets

Some poultrymen prefer to remove all hens at the end of their first laying season because the average rate of decline of egg production with age is about 12 to 20 per cent per year. Light breeds decline somewhat less than heavy breeds from the first to second year. There seems to be at least two schools of thought with respect to keeping hens; one maintains that because hens always take a rest from egg production and molt in the fall, they should be replaced each year with pullets. Without devoting too much space to that question it may be said that replacing with pullets is expensive and that a hen which has proven her ability to live and lay is more valuable as a breeder than an unproven pullet. Hens lay larger eggs, which bring a premium on the market and larger chicks may be hatched from the larger eggs.

Source; Mich; State College-Ext.Bul#221
University of Georgia-Bul#341

HORSES AND MULES

NUMBER - On Farms April 1, 1940: Thousands
(Including Colts Over 3 Months)



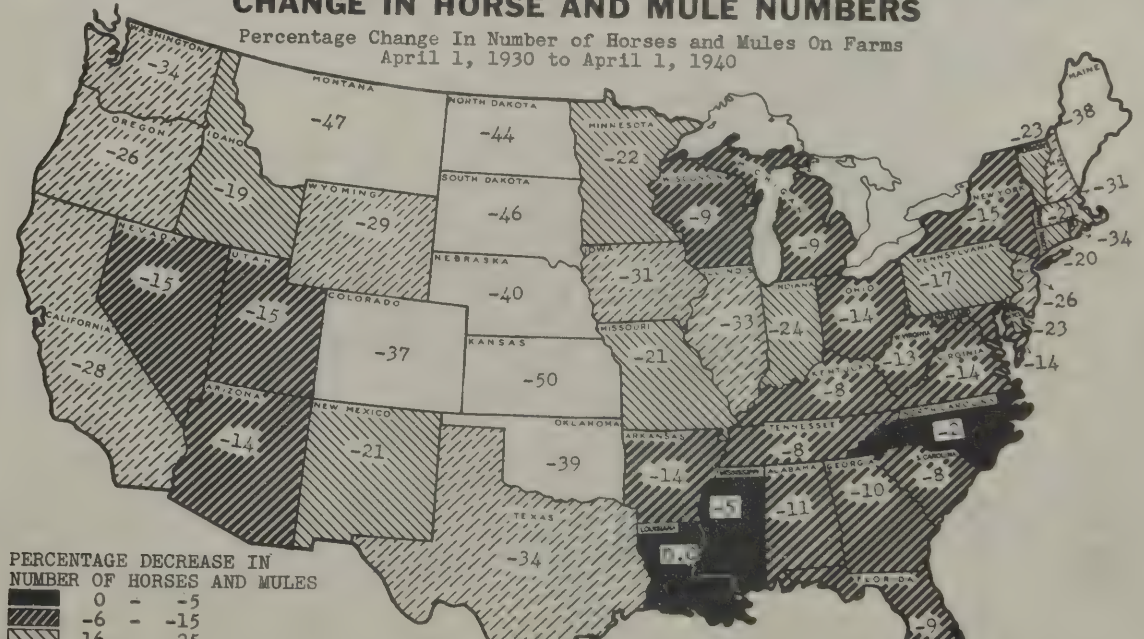
Horses and mules as beasts of burden appear to be passing largely out of the farm picture. Horse and mule numbers reached their peak in 1918 and have declined every year since - 23 years. Between 1930 and 1940 the decline was 26 per cent for the 10-year period. (See Digest page 205.)

Definite regional trends have been imposed upon this general picture. The decline has been much slower in the South and most rapid in the Midwest, Western, and New England States. Total displacements have been greatest in the Corn Belt. No state has shown an increase during the last decade.

The cropland released as a result of less feed requirements for horses and mules amounts to over 80,000,000 acres. This is an area equal to the total land in farms in the ten northeastern states including Ohio, Pennsylvania, and New York.

CHANGE IN HORSE AND MULE NUMBERS

Percentage Change In Number of Horses and Mules On Farms
April 1, 1930 to April 1, 1940

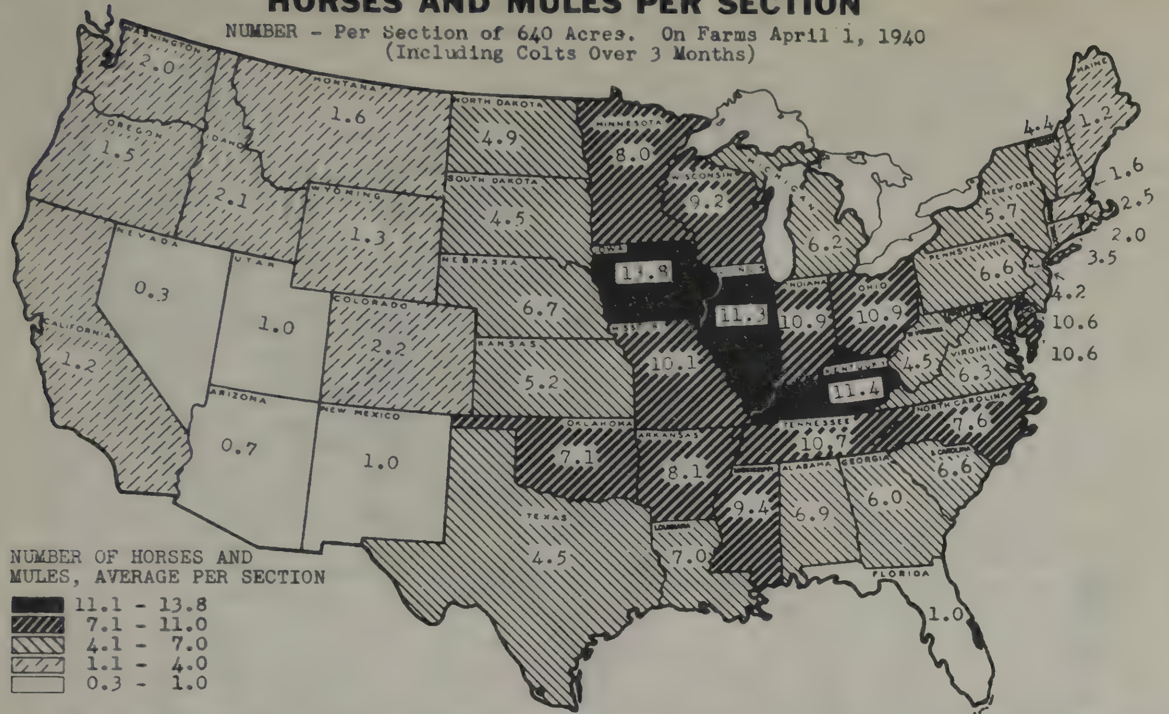


Based on Census Data

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

HORSES AND MULES PER SECTION

NUMBER - Per Section of 640 Acres. On Farms April 1, 1940
(Including Colts Over 3 Months)

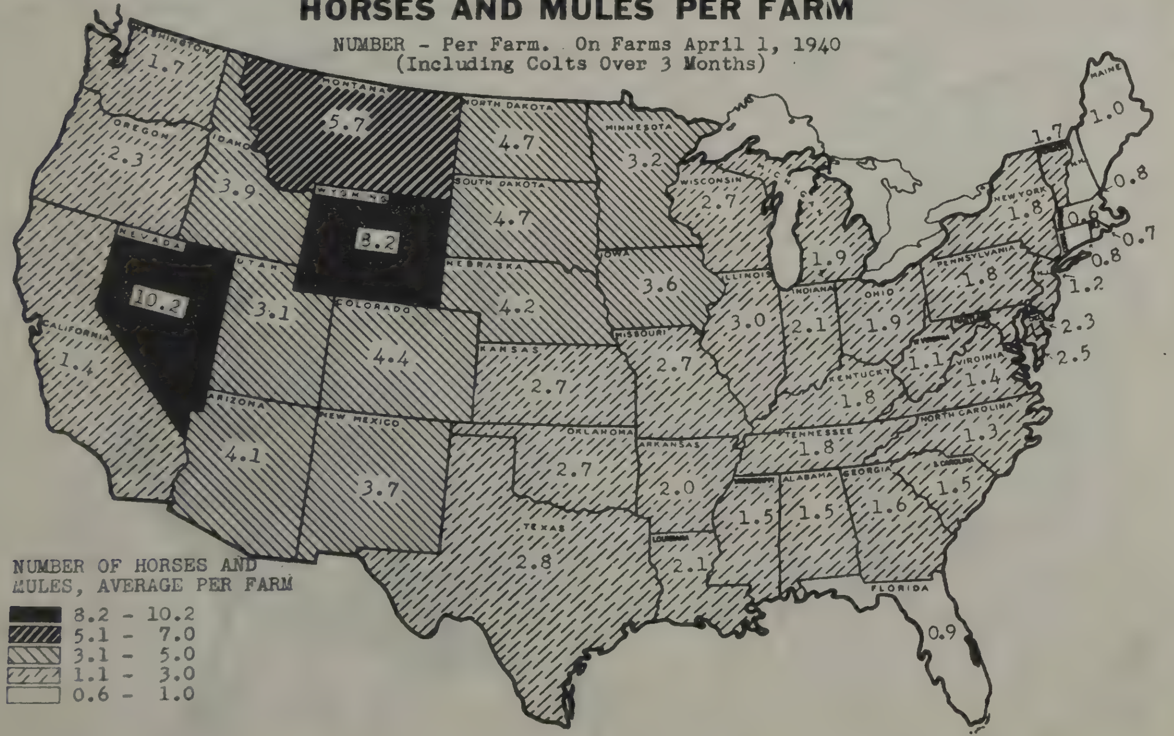


The total number of horses and mules in relation to land area bears a relationship to the agricultural resources of the various areas. Iowa leads all other states in number of horses and mules per section.

The number of horses per farm relates more definitely to the type of farming practiced and the size of the farm. In the South one or two per farm is typical. In the Midwest the number is 2 or 3 and in the ranch areas of the West where holdings are large the number per farm or ranch increases. Nevada leads all other states in having an average of more than 10 horses and mules per ranch.

HORSES AND MULES PER FARM

NUMBER - Per Farm. On Farms April 1, 1940
(Including Colts Over 3 Months)



Based on Census Data

Three Minute Milking and Mastitis Control

MILKING ROUTINE FOR FAST MILKING AND MASTITIS CONTROL

1. Be regular - Start the milking at the same time each day. Milking on an exact schedule has a favorable effect on milk "let down". Arrange cows in the barn so that those which let down milk in response to sounds and milking preparations before the udder washing, are milked first. Place problem cows and infected cows at the end of the line to be milked last.

2. Wash teats and udder - Use 130° F. chlorine water. (250 parts per million of chlorine). A fresh supply of warm chlorine water should be prepared for every ten cows. Massage teats and udder while washing to stimulate "let-down" of the milk. A separate wash cloth is used for each cow and is then thrown into an empty pail on wash cart.

3. Strip cup test - Take one or two full hand squeezes from each teat into the strip cup. Inspect for abnormal milk.

4. Test foremilk - Test each quarter seperately once a month with a chemical test such as the "Bromethymol Blue" or the "Silver Nitrate" tests. Chemical tests will locate early infections several weeks sooner than the strip-cup test.

5. Apply teat-cups - within one minute after washing.

6. Turn the 3-minute timer - after applying milker unit.

7. Strip by machine - Watch the milking and do not leave the machine on after the milk has stopped flowing. When the teat cups start to "crawl up" and shut off the milk flow into the teat, pull them down part way with one hand, and massage the udder with the other hand.

8. Remove teat cups from cow - after 2½ or 3 minutes. Most cows can be trained to milk out in 3 minutes by machine.

9. Dip teat cups - into cold water and then into warm (130°F.) chlorine water (250 p.p.m.). They may then be used on the next cow.

10. Dip each teat - in chlorine water (250 p.p.m.). Use a small cup, discarding the chlorine water after each cow is treated.

How to Prevent and Control Mastitis

1. Keep the herd healthy with adequate rations, and proper housing, and avoid contagious diseases.

2. Keep the barn clean, dry, and well bedded. Superphosphate or lime on the floor will aid in the destruction of bacteria and preserve nitrogen in the manure. Cold, bare floors may chill or bruse the udder.

3. Clip hair on the udder to make washing easier and to prevent dirt from sticking to the udder.

4. Keep cows clean and avoid muddy lots. Mastitis bacteria live in filth. Drain muddy lots and fill holes. Use concrete or limestone surfacing on small lots.

5. Clean infected stalls and barn floors with a lye solution (1 lb. to 20 gals. boiling water).

6. Quarantine and test additions to the herd.

Based on Data from:
University of Illinois
University of Minnesota
University of Wisconsin

7. Dispose of badly infected cows--they spread mastitis.

8. Do not milk onto the floor.

9. Do not feed milk from mastitis cows to heifer calves until it has been pasteurized.

10. Prevent calves from suckling each other.

11. Treat udder and teat injuries promptly. Cleanse wound and apply a 5 per cent sulfanilamide ointment.

12. Avoid use of teat plugs and tubes.

13. Allow no wet hand milking.

14. Use the "strip cup" test before each milking, or at least once a day.

15. Test foremilk from each quarter seperately once a month or oftener. Make a chemical test such as the "Bromethymol

(OVER)

How to Prevent and Control Mastitis (cont.)

Blue" or "Silver Nitrate". Locate new infections before they spread or cause severe tissue damages.

16. Milk the infected cows last.

17. Wash udder with chlorine water (250 p.p.m. chlorine 130° F.) before milking.

18. Use a separate, clean wash cloth sterilized in chlorine water for each cow.

19. Wash hands in chlorine water before handling each cow.

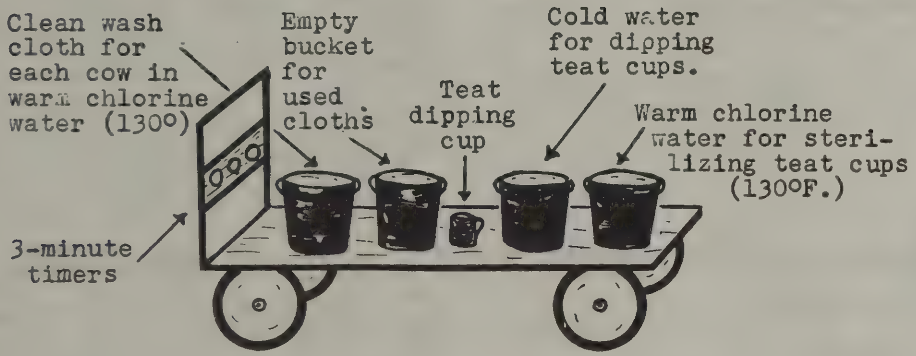
20. Dip teat cups in cold rinsing water and then in warm chlorine water after milking each cow.

21. Machine-strip cows. Avoid prolonged stripping — it often injures teat ducts.

22. Dip teats in a chlorine solution after each milking. Use a fresh solution for each cow.

23. Have a veterinarian treat infected dry cows with injections of antiseptics into the udder. Gramicidin, silver ozide, acriflavine, and sulfanilamide in oil may be used. Penicillin is also being used and appears promising.

Mastitis Control Equipment


Clean wash cloth for each cow in warm chlorine water (130°)
Empty bucket for used cloths
Teat dipping cup
Cold water for dipping teat cups.
Warm chlorine water for sterilizing teat cups (130°F.)
3-minute timers

1. Strip cup.
2. Four buckets.
3. Chlorine solution.
4. Individual wash cloths.
5. Timers (3 min. egg hour-glass or similar type timers.)
6. Teat dipping cup.
7. Hand cart for buckets.

USING THE EQUIPMENT

1. Strip cup is used for the detection of abnormal or mastitis-infected milk. The test is made by drawing the first one or two streams of milk from each quarter through a fine mesh screen arranged over a cup to collect the milk.

2. A separate wash cloth for each cow is essential to prevent spread of mastitis. These should be handled as follows:
   a. After milking is finished, wash the cloths in wash tank with water.
   b. Place in a fresh chlorine solution and let stand until next milking.
   c. Drain off chlorine and put in bucket of fresh (130°) chlorine solution
   d. Wring partly dry using half for washing and the other half to wipe the udder dry.

3. Small 3-minute egg timers can be purchased from hardware or dime stores. These can be used to gauge the milking speed and the time to remove the milker.

4. A teat dipping cup needs to be about 1/2 pint to 1 pint in size. Since the solution should be changed from each cow, a small cup will save chlorine solution.

5. A hand cart of cheap construction will add convenience. All equipment can be moved together in its specific place of order behind the cows being milked.

CATTLE DISEASES

The information on this page gives general descriptions and treatments of cattle diseases. It must be remembered that, aside from treatment of minor ailments and administration of first aid in emergencies, it is not advisable for the stock owner to give drugs or perform surgical treatment. The expert assistance of a veterinarian should be secured as quickly as possible.

BLACKLEG

(Black quarter, quarter ill)

DESCRIPTION: An acutely infectious disease which attacks principally young cattle. Some recover, but death generally occurs in 12-36 hours after first appearance of the disease. It is more or less restricted to definite localities where the soil is infected with the blackleg organism.

CAUSE: A micro-organism known as clostridium chauvoei. It produces spores which are very resistant to destruction and will survive in the soil of pastures for several years. Animals are infected through small punctures of the skin and digestive tract, by thorns, briars, stubble, etc.

SYMPTOMS: Formation under the skin of gaseous swellings or tumors which give off a crackling sound on pressure. Swellings occur especially on hind quarters or shoulder causing lameness or stiffness. Rapid breathing, high fever, suspension of rumination, great depression.

TREATMENT: Medicinal treatment is ineffective but the animals can be protected by vaccination. Where at all possible, the services of a veterinarian should be secured because of the technical nature of administering a hypodermic injection and to be assured of a potent biological product. Wherever possible, one should consult a veterinarian as to the type of vaccine to use and the advisability of repeating the vaccine the following year. If active cases of blackleg are present at the time, the veterinarian may find it advisable to use the anti serum. If there are no available veterinarian services, blackleg vaccine and syringe can be secured by consulting with the county agent or farm supervisor. Directions for the use of the vaccine accompany the package and should be followed closely. Refrain from dehorning, spaying, or castrating at the time of vaccination.

PREVENTION: Carcasses should be completely burned or deeply buried to prevent reinfection of pastures. If possible carcasses should be disposed of at spot where animal died. Dogs, cats, wolves, coyotes, buzzards and crows spread infection far and wide if allowed to feed on carcasses.

ANTHRAX

DESCRIPTION: An infectious disease of livestock caused by a germ existing in the soil of certain anthrax districts. All species of livestock are susceptible to the disease which is transmittable to man.

CAUSE: A micro-organism or germ called the anthrax bacillus (Bacillus anthracis). It survives for long periods in the soil of certain areas, particularly marshy land or land subject to overflow.

SYMPTOMS: Anthrax may be recognized in three forms: (1) Peracute or apoplectic form is characterized by a sudden death as from a stroke. Frequently, examination of a seemingly previously healthy animal will show bloodstain discharges from nose, mouth, and anus. (2) Acute - Usually terminates in death in from 1-2 days. (3) Subacute - May lead to death in 3-5 days or longer or to complete recovery. In both acute and subacute forms there is a state of excitement frequently followed by depression. The head hangs low, and the animal lags behind and refuses to eat, preferring to stand still or lie down. There is rapid, labored breathing, rumination ceases, milk secretion dwindles, and there are bloody discharges from natural body openings. When diarrhea sets in, the feces is usually blood tinged. Pregnant animals may abort. Tongue and glottis may swell showing dark discoloration.

TREATMENT: Call a veterinarian. Diagnosis is difficult, and proper immunization is a highly technical problem. Vaccination affords best means of holding losses to minimum.

PREVENTION: Prompt and effective disposal of carcasses either by thorough burning or burying on high ground. Apply quicklime and bury at least six feet deep. Infected area should be burned over by applying oil and firing. Disinfect anything that has come in contact with the sick animal or carcass.

LUMP JAW

(Big jaw, wooden tongue, actinomycosis)

DESCRIPTION: A disease primarily affecting different organs or tissues of the mouth or throat region. Cattle are most susceptible.

CAUSE: All forms of the disease are caused by the same infective agent - actinomyces - ray fungus, which grows on grain crops and wild grasses. Bearded grasses or strawstacks infected with ray fungus are the primary sources of infection.

SYMPTOMS: Big jaw- Animals may lose flesh because they cannot eat properly. Teeth may become loose due to inflammation and infiltration of pus and actinomycotic growth. Examination of gums on each side of molar teeth will reveal yellow ulcerated areas penetrating into substance of the bone.

Wooden Tongue- Inflammation of certain areas of the tongue causing a swelling and hardening of the tongue.

Lump jaw- The tumors are movable and loosely adherent to the bone. They are hard and do not fluctuate when pressed upon. In later stages pus formations may cause a rupture of the skin, and, by slow pus formation, portions of diseased tissue may escape.

TREATMENT: Surgical Treatment- Best results are obtained where tumor can be removed intact. This should be done by veterinarian because of proximity to large blood vessels and important nerves. Deep seated tumors that cannot be removed can be treated as follows: Make an incision into the tumor allowing pus to escape; flush out cavity with 3 to 5% solution of any of the coal tar disinfectants by means of a syringe. Pack copper sulphate crystals into the cavity. Pack incision with gauze and close with several stitches. Open and remove remaining crystals after 3-4 days. Protect the wound from flies by keeping the area covered with "Smear 62". Isolate the animal.

Medical treatment - In cases of lump jaw, big jaw or wooden tongue the animal can be dosed internally with potassium iodide and treated externally by application of tincture of iodine to diseased part. This treatment, like the above, should only be administered under the supervision of a qualified veterinarian.

PREVENTION: The disease is not contagious from an infected animal to a well animal, but healthy animals may be infected if allowed to run to straw stacks or graze on pastures where cases of lump jaw have developed.

BRUCELLOSIS

(Bang's disease)

DESCRIPTION: An insidious disease commonly referred to as contagious abortion. It results in reduced milk production, sterility and premature birth of offspring. It has been shown that undulant fever in man may be caused by the same germ.

CAUSE: Brucella abortus germ. It is introduced into healthy herds by the addition of infected cows or infected pregnant heifers. The germ may

Sources: 1. Farmer's Bulletins 1736 and 1355
2. U. of Mo. Bulletin 357
3. U.S.D.A. "Diseases of Cattle"

be found in generative organs of bulls, uterus or udder of cows, in certain lymph glands or joints and in organs of newly born calves. Proof that bulls transmit the disease through the act of service is lacking.

SYMPTOMS: Abortion, sterility, or retention of afterbirth. Note - Any of the above may result from other causes. The only certain method of determining the presence of the disease is the blood agglutination test.

TREATMENT: There is no drug, chemical, or medicinal compound that has been proved effective in the prevention or cure of brucellosis. The four methods of control are:

1. Test, and slaughter positive reactors.
2. Calfhood vaccination.
3. Sanitary control or herd management.
4. Test and segregate reactors.

PREVENTION: Buy clean cows from clean herds Quarantine purchased cattle for 3 months and test. Retest cattle taken to fairs or shows. Fence off drainage from areas known to be infected. Use care when visiting farms where infectious diseases exist.

MILK FEVER

(Parturient Paresis or Parturient Hypocalcemia)

DESCRIPTION: It is a disease of cows occurring shortly after calving. Characterized by paralysis of motor and sensory nervous system, and affects almost exclusively the higher-producing, better-nourished animals. Rarely occurs at first calving, sometimes at second, most frequently from third to seventh calving. After the first attack the trouble may occur at one or more subsequent calvings.

CAUSE: Not fully known. The general opinion is that milk fever is an expression of an acute deficiency of calcium in the blood.

SYMPTOMS: Depression and disinclination to move or eat, which sets in from 6 hours to four days after calving. Collapse and complete loss of conciousness follow. The head is turned to one side, eyes are dull, membrane covering the eye is reddened, muzzle is dry and extremities are cold, and body temperature is usually below normal. Pulse and breathing are accelerated, breathing is often labored and sometimes accompanied by groaning.

TREATMENT: Call the veterinarian. He will give an intravenous injection of calcium gluconate in 20% solution, which must be repeated in some cases.

An alternate procedure is to inflate the udder with filtered air. This treatment to be attempted only when the services of a veterinarian are unavailable. There is extreme danger of causing infections of the udder from outside contaminants and thus ruining a high-producing animal. Place sterile cloth under udder, clean udder and teats with warm soapy water and dry with sterile towels. Then disinfect the teats and their openings. Each quarter is then distended with air and the teat tied with a flat tape or bandage which is removed after not more than 3 or 4 hours. Brace the animal so that she rests on her brisket. Pneumonia may develop if the cow is allowed to lie on her side.

PREVENTION: Practical and effective preventive measures are lacking. The only one worthy of mention is to insure an adequate ration for, and proper care of, the pregnant and parturient cow. Cows subject to milk fever should never be milked completely dry for the first week after calving. This will do much to prevent an attack of milk fever.

BOVINE MASTITIS

See Digest Page 281

CATTLE GRUBS OR HEEL FLIES

DESCRIPTION: Cattle grubs are the maggot stage of the insects known as heel flies, warble flies or gadflies. They cost cattlemen, packers, and tanners an estimated $50,000,000 annually. Heel flies develop from grubs that have dropped from the backs of cattle. They cement eggs on lower part of leg usually, but sometimes on under-belly and udder. The eggs hatch and the larvae immediately force their way into the tissue. The larvae move about constantly, but slowly, for nine months feeding, growing and migrating upward. After nine months they emerge on the back of the animal.

SYMPTOMS: Swellings along the backs of animals giving the backs a lumpy appearance.

TREATMENT: Squeezing grubs out by hand or extracting them with forceps, if carried out systematically on isolated herds, will control the pest. An almost 100 per cent effective insecticide, when properly administered, is a mixture containing --

Cube or Derris powder (5% rotenone) --	5 lbs.
Wettable sulphur-	10 lbs.
Water-	100 gals.

This is applied with a power sprayer. Dusting and rubbing in of (5% rotenone) cube or derris powder mixed with equal amount by weight of wettable sulpher is also recommended for smaller numbers of cattle.

PREVENTION: The treatment will also act as a control measure. Substances applied to cattle to keep away the fly have proved both impractical and ineffective.

WHITE SCOURS

(Infectious diarrhea or acute dysentary)

DESCRIPTION: An acute, contagious and infectious disease of young or newborn calves. It attacks, in some cases, less than 48 hours after birth. It is an infectious diarrhea that later affects the entire system.

CAUSE: An invasion of the intestinal tract by certain types of micro-organisms, particularly varieties of the colon bacillus. Infection enters the body either through navel cord or digestive tract.

SYMPTOMS: A profuse yellowish white diarrhea with a disagreeable odor develops 48 to 72 hours after birth. Calves become dull and listless. Gait becomes stiff and the skin rough and dry. Hindquarters are covered with the bowel discharge. Note: Many of the above symptoms may also be present in other forms of diarrhea.

TREATMENT: Medicinal treatment after the onset of the disease is usually of little avail. A hyperimmune calf scour serum given soon after birth will help prevent heavy losses, but is of little use after infection.

PREVENTION:

1. Strict sanitation during and after birth.
2. Clean and disinfect the external genitals, hindquarters, tail and udder of pregnant cow shortly before calving. Remove several streams of milk from each teat and discard.
3. Disinfect navel of newborn calf soon after birth, with tincture of iodine.
4. Before letting new-born calf suckle, its mouth should be washed out with 4% solution of boric acid.

ACUTE TYMPANITES

(Bloating)

DESCRIPTION: A distention of the rumen or paunch with gases of fermentation.

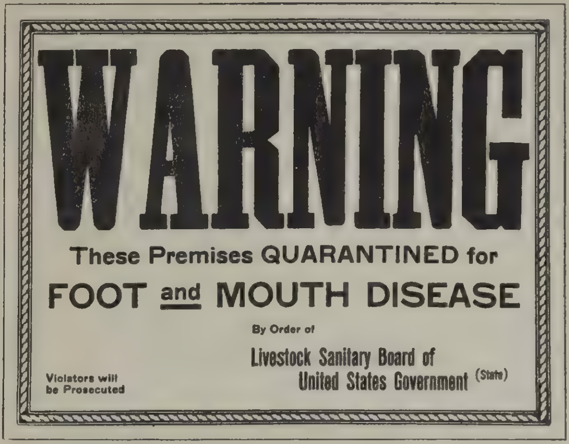
CAUSE: Any kind of food that produces indigestion such as young clover, cabbage, potatoes, turnips, sugar-beet pulp, middlings, corn meal, stubble fields containing strong growths of volunteer grain, wet or dewey legume or grass pasture, frozen roots.

SYMPTOMS: Swelling of left flank, difficult breathing and reeling when standing or walking.

TREATMENT: If case is not extreme, drive animal at a walk for 20-30 minutes, or throw buckets of cold water against cows sides. Some cases can be successfully treated as follows: Place a straw band or rope coated with pine tar, wagon grease or similar substance in cows mouth as a bit and tie securely behind the horns. In urgent cases call the veterinary.

FOOT AND MOUTH DISEASE

DANGER LURKS SOUTH OF THE BORDER



WARNING

These Premises QUARANTINED for

FOOT and MOUTH DISEASE

By Order of

Livestock Sanitary Board of
United States Government (State)

Violators will
be Prosecuted

It may be only weeks or months until a QUARANTINE sign like this is placed on some farm or ranch in the United States.

Foot-and-Mouth disease is in Mexico to stay! There's no method now known by which the disease can be dislodged from Mexico. Eventual success, if it ever comes, depends on finding a new vaccine which would give permanent immunization without making the animal a carrier of the disease.

SYMPTOMS AND LOSSES

Foot-and-Mouth disease is characterized by blisters around the mouth, on the tongue, on the skin between the toes and above the hoofs, and on the teats and udders. These blisters break after a short period, generally within 24 hours, and leave a raw red sore.

Diseased animals are in great pain and cattle salivate so much that "slobbers" hang in long strings from the mouth. In some cases more than half of the skin on the tongue may peel. Sometimes the hoofs come off.

"Death losses seem to be low - roughly one to two per cent. The very heavy losses connected with Foot-and-Mouth disease are those due to decreased milk production, loss of condition, severe mastitis, sterility, and abortion.....In Denmark, mastitis and disturbance of reproductive functions are the conditions which cause the greatest losses." from a personel letter by Dr. N. O. Rasbech of the Royal Veterinary and Agricultural College of Copenhagen, Denmark.

YOUR PART

Any unusual disease outbreak among cattle, sheep, or hogs that could be the beginning of a Foot-and-Mouth disease epidemic should be reported immediately, by telephone or telegraph to your nearest State or Federal veterinarinan's office.

Meanwhile close all possible channels by which the disease may spread. Confine the dogs and cats and other roving livestock.

Conditions that favor the prompt eradication of the Foot-and-Mouth disease are;

◆ Early discovery of the infection.
◆ Cooperation on part of livestock owner.
◆ Dependence on time-tried measures having a scientific basis.
◆ Faith in the ability of the eradication forces.

GOVERNMENT'S PART

The government will cooperate immediately with methods that have been proved successful. In the past, this has meant complete elimination of all infected or exposed herds by the slaughter method. Owners are paid for all livestock killed in accordance with the full appraised value of the animals.

The statement below sets out in more detail the best information available on Foot-and-Mouth diseases.

FOOT-AND-MOUTH DISEASE

CHARACTER OF THE DISEASE

Foot-and-mouth disease is characterized by the formation of vesicles or blisters on the mucous membranes covering the tongue, lips, cheeks, palate, or other tissues of the mouth, on the skin between and above the claws of the feet, and on the teats and udder. In cattle, any one or several of these locations may be involved. In hogs, lesions frequently occur also on and above the snout. In rare cases the muzzles of cattle are affected. In sheep, goats, and deer, the feet are the most common site of the vesicle formation. As a rule, the vesicles rupture within 24 hours, leaving a raw, eroded, red surface. Mouth lesions cause salivation, especially in cattle. In none of these lesions is there the pustule formation which is always so characteristic a part of the disease process in pox diseases.

The lesions of foot-and-mouth disease heal rather rapidly, but in some instances those on the feet may give rise to serious secondary bacterial infections. Before and for a short time after the appearance of lesions there is a striking rise in temperature. During the attack, the animals lose considerable flesh. In cows there is a severe reduction in the milk flow.

The symptoms vary in extent from one or two small vesicles in one of the locations mentioned to extensive involvement of several organs. In some cattle more than half the covering of the tongue may be lifted, and the claws of all four feet may be lost.

The deterioration of the animals may cause far greater loss than the actual mortality, which is estimated in ordinary outbreaks to be approximately 5 percent. There is, however, a malignant form of the disease which may be accompanied by heart lesions. In such outbreaks as many as 50 percent of the affected animals succumb or are so seriously injured that they have to be slaughtered, even in countries where eradication by this method is not practiced.

CAUSATIVE AGENT

The infective agent in foot-and-mouth disease is a filtrable virus. Viruses can pass through filters that hold back the smallest bacteria, and they cannot be seen with the most powerful microscope. The size of the foot-and-mouth disease virus has been estimated to be

FOOT AND MOUTH DISEASE

between 8 and 12 millimicrons, which places it among the most minute of these ultramicroscopic infective agents.

METHODS OF SPREAD

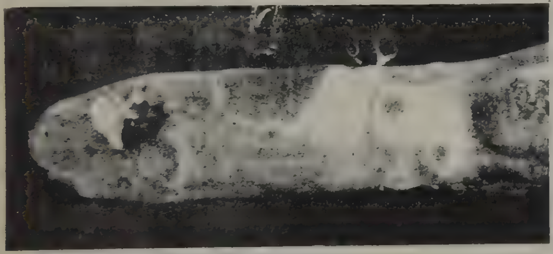
The commonest agent in the spread of foot-and-mouth disease is, of course, the infected animal itself. As already stated, the virus is contained in the fluid and the coverings of the vesicles, as well as in the blood during the febrile stage of the disease. At this time the saliva, urine, milk, and probably other secretions and excretions are also infectious.

The active virus leaving the infected animal contaminates its surroundings and can be carried mechanically by living beings—people, horses, and dogs, for example—or on litter, feed, stable, utensils, and other objects. When contaminated material comes in contact with susceptible animals, the latter can readily become infected. Under conditions favoring the persistence of the virus outside the animal body the danger of spreading infection is considerable. In view of experimental evidence, it is probable that infected animals spread the virus most actively in the early stages of the disease, and they may do so even before any lesions are observable.

On the other hand, the fact that the virus loses its activity in a relatively short time within the body suggests that animals in the later stages of the disease play little part in its spread. In spite of this, investigators and livestock sanitary officials, with only a few exceptions, believe that virus carriers exist, and that such animals may harbor the virus for a long time after recovery. The percentage of carriers, however, is believed to be small. The field evidence presented to support this view is very strong, and numerous instances are reported in which the disease occurred in clean herds shortly after the addition to the herd of animals that had previously had foot-and-mouth disease, other sources of infection having been eliminated. As long as 8 months, and indeed in several instances more than a year after recovery, animals have been held responsible for causing outbreaks of the disease.

Milk, meat, and the raw byproducts of slaughter of infected animals may also be instrumental in distributing the virus. Milk may contain it and, when fed to susceptible animals, may bring about infection. While evidence has been presented to indicate that the infectiousness of milk is lost in souring and also in the fermentation that occurs in the production of cheese, data on the survival of the virus in milk under various conditions are limited in the main to work reported many years ago. This is a subject that should again be investigated experimentally with present-day methods.

The meat or other parts of animals slaughtered in the febrile stage of the disease may be infectious, and feeding such uncooked products to susceptible animals obviously may result in infection.



Tongue from a cow that was badly infected with foot-and-mouth disease. The dark areas are vesicles that characterize the disease. The large one on the upper margin is the eroded area left by a broken vesicle, the darker one at the left with a flap is a freshly broken vesicle, and the three light-colored ones at the right are newly formed and about ready to break. The dark area at the extreme right is a broken vesicle.

DIAGNOSIS

The policy in the United States of slaughtering animals to eradicate the disease when it appears makes the establishment of a definite diagnosis more important than it is in countries where the disease is endemic. Failure to recognize the disease when it exists might permit the extensive spread of the malady, perhaps to such a point that even radical methods would not eliminate it or would do so only at very great cost. On the other hand, to make an incorrect diagnosis of foot-and-mouth disease would mean unnecessarily imposing severe and costly quarantines and restrictions, locally, nationally, and internationally, in addition to needless slaughter of animals. In the United States, therefore, extreme caution is used in making a diagnosis.

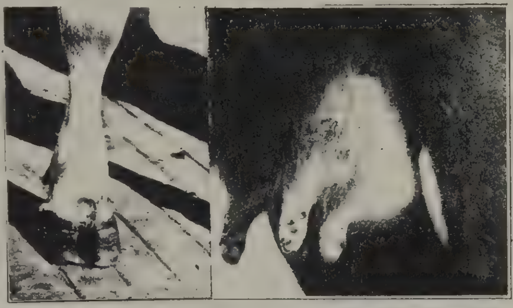
Only two other diseases cause inflammatory changes in the mucous membranes of the mouth or the skin of the feet or both in cattle, swine, sheep, goats, and other cloven-footed animals sufficiently similar to those of foot-and-mouth disease to give the experienced observer difficulty in establishing a diagnosis. These are the virus diseases vesicular stomatitis and vesicular exanthema of swine.

Final Determination

In making a diagnosis the . . . . procedure is to inoculate swine, cattle, guinea pigs, and horses with material obtained from the sick animal. The diagnosis of foot-and-mouth disease is clear and can be made unhesitatingly if typical vesicles, preceded by a rise in temperature, develop in all these animals except the horses. When all the injected animals including the horses develop vesicular lesions, the disease would be diagnosed as vesicular stomatitis. When lesions are produced in swine, less frequently and to a milder degree in horses, and not at all in cattle or guinea pigs, the condition is typical of vesicular exanthema of swine.

CONTROL AND ERADICATION MEASURES

Two methods are now in general use in the control and eradication of foot-and-mouth disease: (1) The stamping-out, or slaughter method, which has been used in the United States and England and at various times in other countries; and (2) the quarantine procedure, which is used in most European countries. Which one of these methods is adopted depends upon prevailing conditions. The slaughter method is no doubt economically more practicable in the United States than in some other countries. Many European countries, however, have laws and regulations providing for the slaughter of animals affected with foot-and-mouth disease. These regulations can be put into effect whenever those in control believe that this will prevent the extension of the disease.



Foot lesions of foot-and-mouth disease–Blisters and scabs of foot-and-mouth disease on teats.

The effectiveness of the slaughter method depends upon three principal procedures:

(1) The slaughter and proper disposal of animals remove at once the greatest source of active virus and avoid the possibility of having carriers remain alive. The slaughter and burial are carried out as rapidly after diagnosis as possible. Frequently disposal has been accomplished within 18 hours after the report of infection.

(2) The thorough cleaning and disinfection of the premises and of materials possibly contaminated with virus remove and destroy the greater portion of whatever virus may remain active after proper burial or burning of slaughtered carcasses.

(3) Test animals, including cattle and hogs, are allowed to feed and graze where they will come in contact with all parts of premises and objects which might have been contaminated with foot-and-mouth virus. Hogs are especially desirable in these tests on account of their rooting habits. If any virus has escaped the cleaning and disinfecting processes, the test animals should reveal it by contracting the disease.

Getting The Job Done

Public understanding and cooperation are essential for the prompt suppression of possible future outbreaks of this highly infectious and very serious malady. All persons should report immediately to State and Federal veterinary officials, preferably by telephone or telegraph, any case suspected of being foot-and-mouth disease. Promptness is especially desirable when there is a possibility of the animals' being moved from their home ranges, pastures, or premises. Meanwhile efforts should be made to close completely all channels by which infection may escape from the area involved. No movement of livestock or commodities from the premises should be permitted. Dogs, cats, poultry, and other roving animals should be closely confined.

As a means of offsetting losses to livestock owners from the condemnation of animals during an outbreak, the State and Federal Governments have paid indemnities based on the full appraised value of animals slaughtered. To allay excitement and groundless rumors, which frequently accompany the appearance of foot-and-mouth disease, the Department of Agriculture disseminates dependable information concerning outbreaks promptly through the press and by radio broadcast.

Briefly, conditions that favor the prompt eradication of foot-and-mouth disease are: (1) Early discovery of the infection, (2) a cooperative attitude on the part of livestock owners and local agencies, (3) dependance on time-tried measures having a scientific basis, and (4) faith in the ability of the eradication forces to conquer the disease again as they have done before.

Source -- U.S.D.A. yearbook of Agriculture 1942. Also, Diseases of Cattle Revised Edition and Farmers Bulletin NO. 666

EXTERNAL PARASITES OF LIVESTOCK

SPRAY CONTROL SCHEDULES

TIME TO TREAT	TREATMENT FORMULA	RECOMMENDATIONS
CATTLE GRUBS OR HEEL FLIES		
October November December January	7½ pounds of 5 per cent rotenone to 100 gallons of water. This is a 0.04 per cent rotenone solution.	Apply solution to backs with power pressure sprayer. Use 400 to 600 pounds pressure* and a driving spray. Hold nozzle 15 inches from back. First treatment about 30 days after first grubs appear. Follow with 2 or 3 more treatments at 24 to 30-day intervals until grubs disappear. Use 1 gallon per animal. If lice or ticks are present, cover the entire body. When spraying grubs with low pressure equipment, use a stiff brush to break scabs and allow the spray to get into the holes.
CATTLE LICE		
September October November	8 pounds of 50 per cent wettable DDT powder to 100 gallons of water. This is a 0.50 per cent solution. Or -- 4 pounds of wettable Benzene hexachloride - (BHC) powder of 10 per cent gamma isomer content to 100 gallons of water.	Apply the spray formula with power pressure sprayer using 400 to 600 pounds pressure.* Spray the entire body, especially the head, neck, and underline. Use from 1 to 2 gallons of the spray formula per animal. Use underline spray in the chute. Repeat again in 14 - 16 days. Cattle well-covered when treated for hornflies will not have lice. If cattle are infested with lice at the time of spraying for grubs, add 8 pounds of 50 per cent wettable DDT powder to the rotenone. Follow this procedure on the first grub treatment only. Since the use of BHC is still somewhat experimental, the amount applied is being kept small, and one spraying may not give complete control. BHC kills both the lice and lice eggs.
HORN FLIES AND MOSQUITOES		
June July August	4 pounds of 50 per cent wettable DDT powder to 100 gallons of water. This is a 0.25 per cent DDT solution.	Number of applications can be determined by observation of horn fly numbers. Make first treatment when 5 flies per animal are counted for 3 consecutive days. Make later sprayings when fly count on 3 consecutive days averages 5 to 10 horn flies per animal, usually at 3 to 4-week interval. Apply the spray formula with a power pressure sprayer, using 400 to 500 pounds pressure.* Use 1 to 2 quarts of spray solution per animal. If cattle are well-drenched the first two treatments, lice will also be controlled and a longer period of fly control will be obtained.

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* Sprays may be applied with pressures of 50 to 100 pounds but control may not last as long. Whenever lower pressures are used, more spray material should be put on the animals, making sure to cover all parts of the body completely.

EXTERNAL PARASITES OF LIVESTOCK
SPRAY CONTROL SCHEDULES

TIME TO TREAT	TREATMENT FORMULA	RECOMMENDATIONS
STABLE FLIES AND MOSQUITOES		
June July August	8 pounds of 50 per cent wettable DDT powder to 100 gallons of water. This is a 0.50 per cent DDT solution. For seasonal control of buildings, use 32 pounds of 50 per cent wettable DDT powder to 100 gallons of water. This is a 2.0 per cent DDT solution.	Make first treatment when 5 flies per animal are counted for 3 consecutive days. Make second treatment about 15 days after the first, and the third from 3 to 4 weeks after the second. Spray buildings each time cattle are sprayed. This is better than seasonal control because dust accumulation and temperatures over 80° F. reduce the effectiveness of DDT. Apply the spray formula with a power pressure sprayer, using 400 to 500 pounds pressure.* Cover the entire body, using 1 to 2 gallons of the spray solution. For seasonal control -- Spray, at beginning of fly season, inside walls, ceilings, window frames, supports, piping, and wires of all buildings where stock is housed. Also spray fences, outside of buildings, and every other place where flies concentrate. For effective control of stable flies, also eliminate breeding places, such as decaying manure. Use pressures of 60 to 100 pounds on buildings.
HOG MANGE MITES		
Year-round	8 pounds of dry lime sulfur to 25 gallons of warm water or 1 gallon liquid lime sulfur to 13½ gallons of warm water. Or -- 20 pounds of wettable Benzene hexachloride (BHC) powder, 10 per cent gamma isomer, in 100 gallons of water. This makes a 0.25 per cent Benzene hexachloride (BHC) solution.	Lime Sulfur -- Apply under pressure, using 400 to 500 pounds of pressure.* Completely drench all animals in the entire herd. Make two treatments 10 to 14 days apart. BHC--Apply under pressures of 400 to 500 pounds* Get animals thoroughly wet, which will require 1 to 2 quarts per animal. Complete control with one treatment. Treat all hogs, especially brood sows, pens and houses prior to spring and fall farrowing. Clean the pens, then spray the houses, pens, and hogs. It is preferred to treat about 30 days before farrowing. Treat pigs any time. Do not treat hogs later than 60 days before slaughter.
HOG LICE		
Year-round	8 pounds of 50 per cent wettable DDT powder to 100 gallons of water. Or -- Crude oil	DDT -- Apply with power pressure sprayer, using 400 to 500 pounds pressure.* Apply spray to thoroughly wet the animals. Satisfactory control can be obtained with one treatment, but for complete control follow with a second treatment in 14 to 16 days. Crude oil -- Apply with hand sprayer. Make two treatments 14 to 16 days apart. Do not treat when weather is cold, and do not turn animals out in the hot sun.
SCREWWORMS		
May to October	Formula for Smear 62 -- 6 oz. diphenylamine 6 oz. commercial benzol 2 oz. neutral turkey red oil 4 oz. lampblack Dissolve the diphenylamine in the benzol, which may take 24 hours. Then stir in the turkey red oil and lampblack to form a smooth mixture about the thickness of molasses. Smear 62 can be purchased already mixed. Or -- Benzol-Pine Tar	Smear 62 -- Treat all wounds with this combined killer and wound protector as soon after injury as possible, regardless of whether screwworms are present or not, since it is a surgical dressing as well as a worm killer. Spread around edge at least 1 inch into hair. Benzol-Pine Tar-- Excellent to kill the maggots. An oil can works well for injecting the liquid deep into infested wounds after swabbing out with cotton. Use liberally and plug wound with benzol-saturated cotton. Then smear with pine tar ointment over and around the wound to prevent reinfestation. If wound continues to drain, continue treatments and search for maggots deep in the wound. There are some claims that DDT-treated animals have not been infested with screwworms. These statements have not been substantiated by research workers.

Source: Extension Service, South Dakota State College; Extension Service, Texas A & M; Extension Service, U. of Missouri; Extension Service, U.S.D.A.

* See footnote on front page.

DETERMINING THE AGE OF FARM ANIMALS BY THEIR TEETH

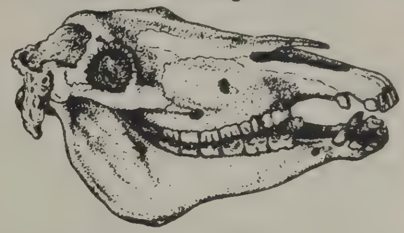
THE PRODUCTIVE LIFE of farm animals is comparatively brief, the height of their usefulness being limited to a few years. For this reason the returns from livestock tend to decrease with advanced years. The age of animals, therefore, is a matter of utmost importance to the breeder, the seller, and the buyer.

Physical changes within the body are constant. They affect the general outward appearance and disposition and, within certain limitations, it is not difficult by mere general appearance to distinguish the young animal from one that has reached maturity, or even to determine the approximate age of an old animal. Changes which take place in the teeth, however, afford the best opportunity of determining the age.

With a knowledge of the age at which the teeth appear, the time for shedding temporary or milk teeth and their replacement with permanent teeth, and the changes in form which result from natural wear, the approximate age of farm animals can be determined. Theoretical knowledge, however, is not sufficient, and any one who would become proficient must also have practical experience.

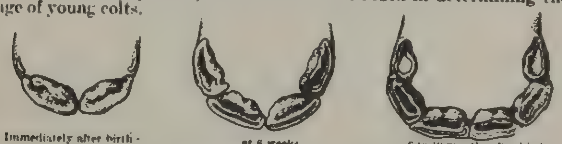
HORSES AND MULES

The ordinary observer can readily learn to tell the age of horses or mules with considerable accuracy until the animals have passed their eighth year. Beyond this time even those who are experienced may find it difficult to determine the exact age.


skull of the horse (from Frateur)

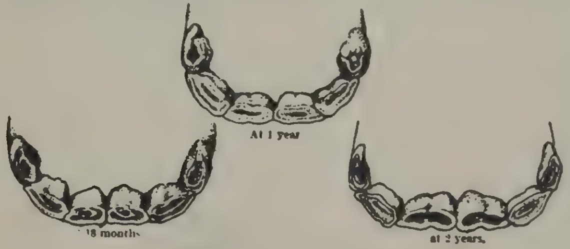
The mature male horse has 40 teeth. Twenty-four of these are molars or grinders, 12 are incisors or front teeth, and 4 are tushes or pointed teeth. The 2 central incisors are known as centrals or nippers; the next 2, 1 on each side of the nippers, are called intermediates or middles, and the last, or outer pair, the corners. The tushes are located between the incisors and the molars. They are not usually present in the mare, and accordingly she may be considered to have a total of 36 teeth rather than 40, as in the male.

The young animal, whether male or female, has 24 temporary teeth, commonly called milk teeth, as they are much whiter than the permanent teeth. These milk teeth consist of 12 incisors and 12 molars. The latter are the 3 back teeth on each side of both the upper and the lower jaw. The milk teeth are shed and replaced by permanent teeth at fairly definite periods, which serve as an index in determining the age of young colts.

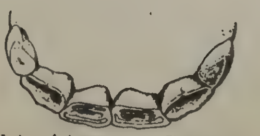

Immediately after birth · at 6 weeks · 6 to 10 months after birth

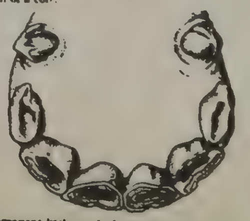
Temporary incisor teeth of a young colt

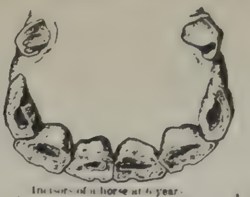
When the colt is from 6 to 10 months old the corner or outer incisors, two above and two below, are cut. This gives the young animal a full set of temporary front teeth. At about 2½ years, the shedding of the milk teeth begins and at 3 years the temporary central nippers, two above and two below, are replaced by the permanent central incisors.

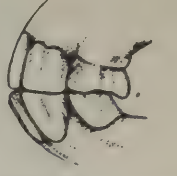

At 1 year · 18 months · at 2 years.

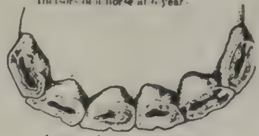
Appearance of the incisor teeth of a colt.


Incisors of a horse at 4 years. The permanent incisors are the four in the center, and the temporary ones are at the corners

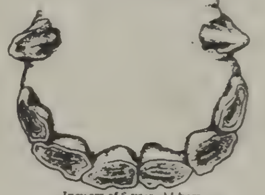

Permanent incisors of a horse at 5 years. The tushes also shown here indicate that the animal

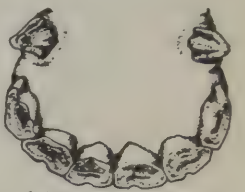

Incisors of a horse at 6 years


Note. In upper corner incisors, the notch which appears at this age.

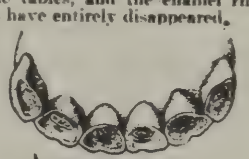

Incisors of a 7-year-old horse

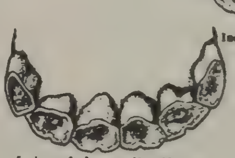
In the 8-year-old horse all the incisors are worn, the cup has entirely disappeared from the nippers, but shows to a slight extent in the middles, and is still well marked in the corners. At this stage what is termed the "dental star" makes its appearance as a yellow transverse line just back of the front edge of the table, or flat surface, of the nippers and middles.

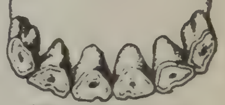

Incisors of 8-year-old horse. Dark line in front of cup is the dental star.


Incisors of a male horse 9 years old.

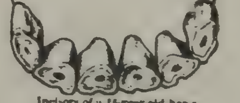
Between the ages of 9 and 13 years there is a gradual change in the contour of the tables of the incisors. At 13 years of age all the lower incisors are unmistakably rounded, the dental star is found in the center of all the tables, and the enamel rings which formerly surrounded the cups have entirely disappeared.

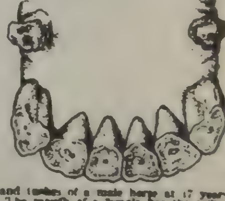

Incisors of a horse at 10 years.


Incisors of a horse at 11 or 12 years.

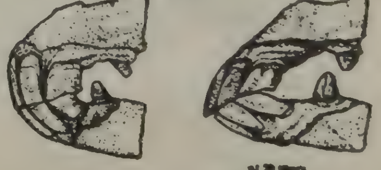

Incisors of a horse at 13 years.

In a horse about 14 years of age the tables of the incisors begin to change from a rounded to a triangular contour.


Incisors of a 14-year-old horse.


Incisors and tushes of a male horse at 17 years. The mouth of a female has the same appearance except for the absence of tushes.

During the following 4 years after the appearance of the triangle, there is a gradual approach of the tables to the form of a rectangle. The teeth during this period are usually elongated and directed obliquely. The dental arch also becomes contracted and pointed and the under edges of the lower jaw are thin and sharp as compared with their appearance in a young horse


at 20 years

Comparison of incisors and tushes of horses at different ages

Should the animal live more than 20 years, these conditions become more marked and are accompanied by excessive wear and loosening or loss of molars.

DOANE AGRICULTURAL DIGEST NOV., 1946

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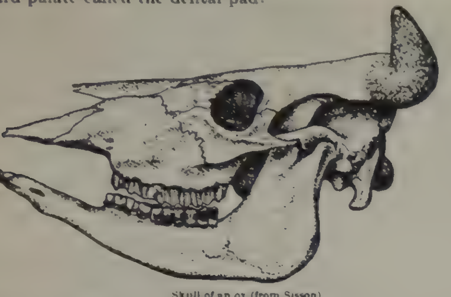
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

291.1

DETERMINING THE AGE OF FARM ANIMALS BY THEIR TEETH

CATTLE

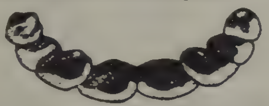
Cattle at maturity have 32 teeth, of which 8 are incisors. All incisors are in the lower jaw. The two central incisors are called pinchers; the next two, first intermediates; the third pair, second intermediates or laterals; and the outer pair is known as the corners. In place of the upper incisor teeth there is a thick layer of the hard palate called the dental pad.



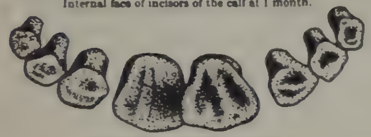
Skull of an ox (from Sisson)

In the calf at birth two or more of the temporary or first set of incisor teeth are present. Within the first month the entire eight incisors have appeared.

As the animal approaches 2 years of age the central pair of temporary incisor teeth or pinchers is replaced by the permanent pinchers. At 2 years these teeth attain full development.



Internal face of incisors of the calf at 1 month.



Internal face of incisors at 2 years.

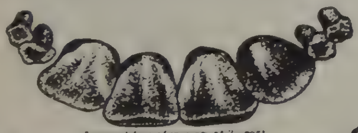
At about 2½ years the permanent first intermediates, one on each side of the pinchers, are cut and are usually fully developed at 3 years.

At 3½ years the second intermediates or laterals are cut. They are on a level with the first intermediates and begin to wear at 4 years.

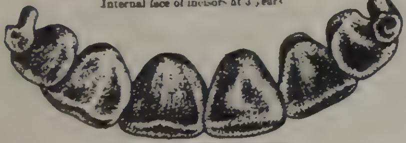
At about 4½ years the corner teeth are replaced. At 5 years the animal usually has the full complement of incisors with the corners fully developed.

At 5 or 6 years there is a leveling of the permanent pinchers, the pinchers usually being leveled at 6 years and both pairs of intermediates partially leveled and the corner incisors showing wear.

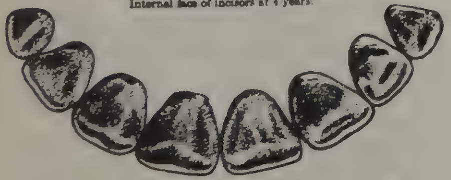
At 7 or 8 years there is a noticeable wearing of the pinchers; at 8 or 9 years, of the middle pairs; and at 10 years, of the corner teeth.



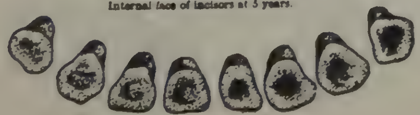
Internal face of incisors at 3 years



Internal face of incisors at 4 years.



Internal face of incisors at 5 years.

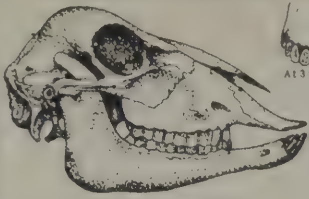


Internal face of incisors at 12 years.

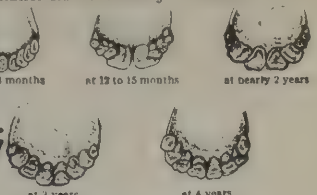
After the animal has passed its sixth year, the arch gradually loses its rounded contour and becomes nearly straight by the twelfth year ~~(fig. 25)~~. In the meantime the teeth gradually become triangular in shape, distinctly separated, and show progressive wearing to stubs. This condition becomes more marked with increasing age.

SHEEP AND GOATS

Mature sheep and goats have 32 teeth, of which 24 are molars and 8 are incisors. There are no tusks and, like those of cattle, all the incisors are in the lower jaw. As in the case of cattle, also, the two central incisor teeth are called pinchers; the adjoining ones, first intermediates; the third pair, second intermediates; and the outer ones, corners. The temporary incisors are readily distinguished from the permanent ones by their smaller size and milky whiteness.



Skull of a sheep (from Sisson)



At 3 months

at 12 to 15 months

at nearly 2 years

at 3 years

at 4 years

Incisors of sheep at different ages

In the new-born animal none of the teeth may have made their appearance though sometimes the two pinchers and also the two first intermediates are pressing through the gums or even have cut through. In a few days these teeth and the second intermediate incisors will appear, followed somewhat later by the corners, thus giving the animal by the time it is 3 months old, a full set of completely developed temporary incisor teeth.

When the animal is between 12 and 15 months of age the temporary pinchers are replaced by the two permanent ones.

The shedding of the first temporary intermediates and their replacement by permanent teeth indicate that the animal is approaching its second year

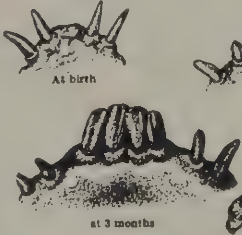
The replacement of the second temporary intermediates by the permanent ones takes place when the animal is about 3 years old.

The two temporary corner incisors are replaced by permanent teeth as the sheep reaches the age of 4 years. All the permanent teeth are then present, and the animal has what is termed a "full mouth"

After this time there is a distinct and progressive increase in size of the spaces between the teeth, which gradually become worn to stubs and frequently attain an unnatural and uneven length. In old sheep some teeth may be broken or loose; in such cases the animal is said to have a broken mouth.

SWINE

A mature hog has 44 teeth. Of these, 12 are front teeth or incisors, and 6 are in the upper and 6 in the lower jaw. Four others lie in the open spaces back of the incisors and are known as tusks, or tushes. They are usually more prominent in the male than in the female. Back of each tush is a tooth commonly called the premolar, and immediately back of this on each side of the upper and lower jaws there are 6 molars, the first 3 in each row sometimes being termed premolars. As in the horse, the incisors are grouped in three pairs in each jaw and are termed centrals, intermediates, and corners in accordance with their relative positions.

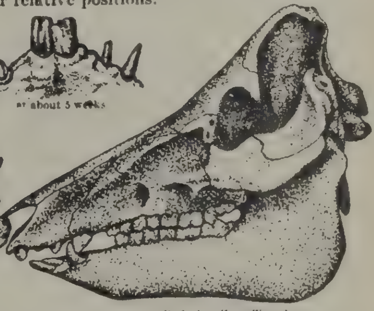


At birth

at about 5 weeks

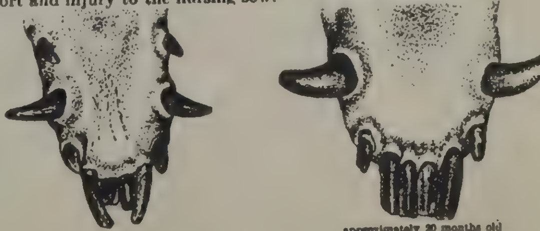
at 3 months

Teeth in the lower jaw of the hog



Skull of a hog (from Sisson).

The young pig at birth usually has 8 teeth. These consist of the 2 tusks and 2 corner incisors on each jaw. They are all sharply pointed and are sometimes known as needle teeth. It is a common practice to cut them off, about halfway between the gum and point of the tooth, in the new-born pig, in order to avoid discomfort and injury to the nursing sow.



approximately 20 months old

Lower front teeth of a hog The prominent tusks indicate that the animal is a boar.

After 2 years it is difficult to judge the age of swine by the teeth. However, except in the case of breeding and exhibition animals, it is not often important to know the exact age of mature hogs. It is possible, however, to associate progressive wear of the teeth with the advance in age. Aged swine show considerable wear of the teeth, especially of the molars

FARMERS' BULLETIN 1721, U. S. Dept. Agr.

LIVESTOCK WEIGHTS FROM MEASUREMENTS

The Minnesota Method

Weight of Cattle

The formula used in determining the weight of cattle is as follows. (Take measurements in inches.)

$$\text{Heart girth} \times \text{heart girth} \times \text{length} \div 300 = \text{weight in pounds}$$

As an example, let us assume it is desired to determine the weight of an animal having a heart girth of 80 inches and a length of 70 inches. These figures are then used in the formula as follows:

$$80 \times 80 \times 70 \div 300 = \text{weight in pounds}$$
$$80 \times 80 = 6{,}400$$
$$6{,}400 \times 70 = 448{,}000$$
$$448{,}000 \div 300 = 1{,}493.3.\ \text{weight in pounds}$$

Weight of Horses

In determining the approximate weight of horses, the heart girth and length are obtained in the same manner as for cattle (see fig. 1). The same formula is used, but the result obtained will ordinarily be about 50 pounds short of the actual weight. Fifty pounds should be added, therefore, after dividing by 300. Measurements should always be kept in inches.

$$\text{Heart girth} \times \text{heart girth} \times \text{length} \div 300 + 50\ \text{pounds} = \text{weight in pounds}$$

In tests of the reliability of this formula, the average difference between the actual and estimated weights of the horses on which it was used was approximately three per cent.

Weights of Sheep and Goats[1]

The weight of a sheep or of a goat may be determined in exactly the same manner as for cattle. It is difficult to estimate the weight of an unshorn sheep, but if care is used in parting the fleece when taking the heart girth, the approximate weight may be determined. With the sheep and goats on which the method was tested, there was a difference between the actual and estimated weights of approximately seven per cent.

Weight of Hogs

In determining the weight of hogs, the length is taken from the base of the tail to a point midway between the ears. The position of the head is particularly important when taking this measurement; it should be held as shown in figure 3.

The formula used is as follows (measuring in inches):

$$\text{Heart girth} \times \text{heart girth} \times \text{length} \div 400 = \text{weight in pounds}$$

The formula is more accurate when used on hogs under 300 pounds than on those that are heavier. Greater accuracy, especially on mature hogs, will usually result if the weights obtained by the formula are adjusted by the amounts shown in the table for hogs of various weights.

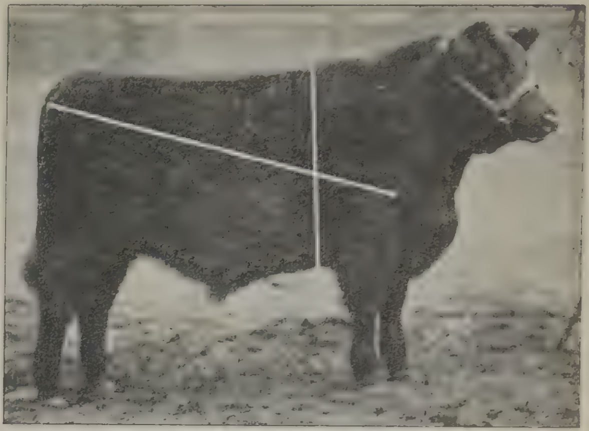


Fig. 1. Places at Which Length and Heart Girth are Measured

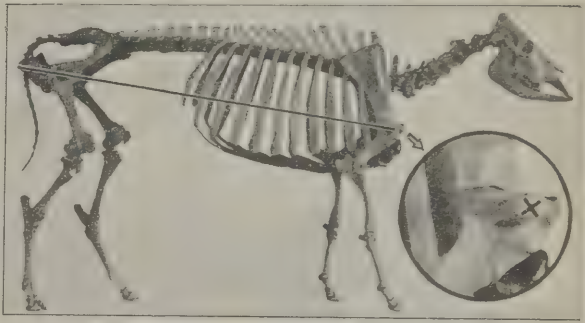


Fig. 2. Cow Skeleton Showing Line for Measuring Length

Enlarged view in circle shows detail of bone structure at shoulder prominence. The cross "X" marks exact spot of taking measure. Locate it on the animal by feeling with the fingers.

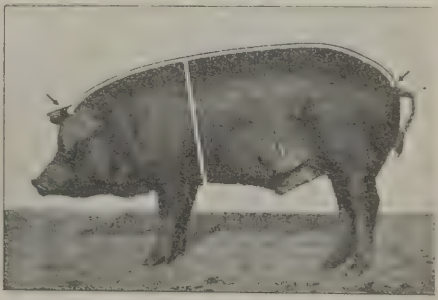


Fig. 3. Places at Which Heart Girth and Length are Taken

Weight obtained by formula	Adjustment needed
(pounds)	(pounds)
Under 150	Add 7
150-400	No adjustment
401-425	Subtract 10
426-450	Subtract 20
451-475	Subtract 30
476-500	Subtract 40
501-525	Subtract 50
526-550	Subtract 60
551-575	Subtract 70
Over 575	Subtract 80

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[1] E. S. Thompson of Bristol, Pennsylvania, furnished data on goats.

AGRICULTURAL EXTENSION DIVISION—UNIVERSITY OF MINNESOTA
Extension Folder 70 May 1939

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

GESTATION TABLE

Date of Service	Probable Date of Birth				
	Mare	Jennet	Cow	Sow	Ewe & Goat
Jan. 1	Dec. 7	Dec. 31	Oct. 11	Apr. 25	May 31
6	12	Jan. 5	16	30	June 5
11	17	10	21	May 5	10
16	22	15	26	10	15
21	27	20	31	15	20
26	Jan. 1	25	Nov. 5	20	25
31	6	30	10	25	30
Feb. 5	11	Feb. 4	15	30	July 5
10	16	9	20	June 4	10
15	21	14	25	9	15
20	26	19	30	14	20
25	31	24	Dec. 5	19	25
Mar. 2	Feb. 5	Mar. 1	10	24	30
7	10	6	15	29	Aug. 4
12	15	11	20	July 4	9
17	20	16	25	9	14
22	25	21	30	14	19
27	Mar. 2	26	Jan. 4	19	24
Apr. 1	7	31	9	24	29
6	12	Apr. 5	14	29	Sept. 3
11	17	10	19	Aug. 3	8
16	22	15	24	8	13
21	27	20	29	13	18
26	Apr. 1	25	Feb. 3	18	23
May 1	6	30	8	23	28
6	11	May 5	13	28	Oct. 3
11	16	10	18	Sept. 2	8
16	21	15	23	7	13
21	26	20	28	12	18
26	May 1	25	Mar. 5	17	23
31	6	30	10	22	28
June 5	11	June 4	15	27	Nov. 2
10	16	9	20	Oct. 2	7
15	21	14	25	7	12
20	26	19	30	12	17
25	31	24	Apr. 4	17	22
30	June 5	29	9	22	27
July 5	June 10	July 4	Apr. 14	Oct. 27	Dec. 2
10	15	9	19	Nov. 1	7
15	20	14	24	6	12
20	25	19	29	11	17
25	30	24	May 4	16	22
30	July 5	29	9	21	27
Aug. 4	10	Aug. 3	14	26	Jan. 1
9	15	8	19	Dec. 1	6
14	20	13	24	6	11
19	25	18	29	11	16
24	30	23	June 3	16	21
29	Aug. 4	28	8	21	26
Sept 3	9	Sept. 2	13	26	31
8	14	7	18	31	Feb. 5
13	19	12	23	Jan. 5	10
18	24	17	28	10	15
23	29	22	July 3	15	20
28	Sept. 3	27	8	20	25
Oct. 3	8	Oct. 2	13	25	Mar. 2
8	13	7	18	30	7
13	18	12	23	Feb. 4	12
18	23	17	28	9	17
23	28	22	Aug. 2	14	22
28	Oct. 3	27	7	19	27
Nov. 2	8	Nov. 1	12	24	Apr. 1
7	13	6	17	Mar. 1	6
12	18	11	22	6	11
17	23	16	27	11	16
22	28	21	Sept 1	16	21
27	Nov. 2	26	6	21	26
Dec. 2	7	Dec. 1	11	26	May 1
7	12	6	16	31	6
12	17	11	21	Apr. 5	11
17	22	16	26	10	16
22	27	21	Oct. 1	15	21
27	Dec. 2	26	6	20	26
Jan. 1	7	31	11	25	31

The period of gestation for animals of the same kind varies to some extent but the following are about the average:

	Days	Months
Mare	340	11
Jennet	365	12
Cow	283	9-1/2
Sow	114	4
Ewe	150	5
Goat	150	5
Dog	63	2
Cat	50	1-2/3
Rabbit	30	1
Fox	53	1-3/4
Mink	48	1-3/5

BREEDING TABLE

Animal	Periods of Puberty		Oestrus (Heat)			
	Ave. Age (Months)	Best Age to Breed (Months)	Duration	Repeats	Occurs After Parturition	Time to Breed After Delivery
Jennet	12	24 to 36	3 to 7 days	3 weeks	3 to 17 days	9th day
Mare	10	24 to 36	3 to 7 days	3 weeks	3 to 17 days	9th day
Cow	10	18 to 24	3 to 48 hours	3 weeks	28 days	6 to 8 weeks
Sow	6	9 to 10	1 to 5 days	3 weeks	3 to 9 days	8½ weeks
Ewe	6	18 to 20	1 to 3 days	13 to 19 days	6 to 7 months	Summer and Fall

MATING TABLE

Animal	No. of Matings
Horses:	
2-year old stallion	10
3-year old stallion	30
4-year old stallion	35 to 40
5-year old stallion	40 to 75
Cattle:	
Yearling bull	20
2-year old or over	40 to 75
Hogs:	
Boar pig	5 to 20
Yearling boar	20 to 30
Mature boar	35 to 40
Sheep or Goats:	
Ram lamb or buck kid (only to test)	5 to 8
Ram or buck 18 months old or over	30 to 50

Based on Data of U.S.D.A.

INCUBATION PERIOD

	Days
Chicken	21
Duck	28
Duck (Muscovy)	36
Goose	30
Pigeon	19
Guinea Fowl	28
Ostrich	42
Pheasant	23
Peafowl	28
Quail	23

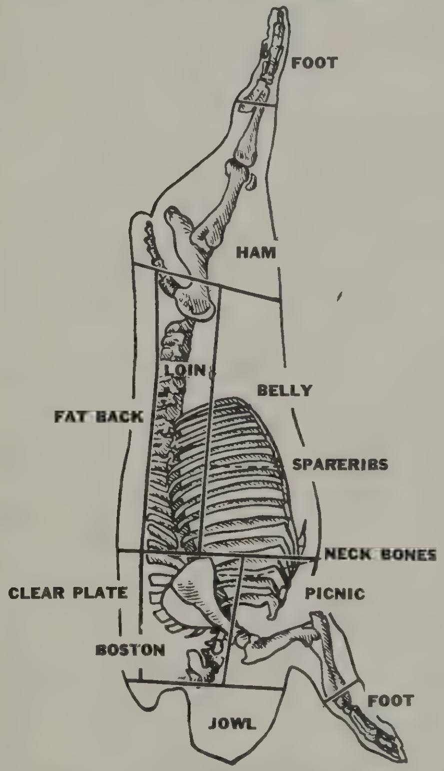
BUTCHERING HOGS

To obtain the most wholesome and palatable meat and meat products, a number of important factors must be considered in the selection, care and handling of animals previous to slaughter. Important among these are: health, condition, quality, breeding, type, age, weight and general care. Slaughtering should be completed early in the winter season to have subsequent weather cold enough for curing.

Hogs should be allowed water but no feed for 24 hours before slaughtering. To kill, draw the live hog up by one hind leg with a block and tackle and stick it, using a six or eight inch sticking knife. Insert the knife at an angle of about 30 or 35 degrees, about two inches in front of the breast bone and directly over the midline. Make a long incision from the point of the breast-bone toward the chin, inserting the knife to a depth of approximately six inches, depending on the size of the hog. This is preferable to shooting or stunning.

The carcass should be divided while it is still warm by sawing through the backbone, then cooled quickly and completely without freezing. The leaf lard should be loosened before it hardens. The time required for cooling will depend on the temperature and whether the carcass is in the sunshine. Smooth, uniform and attractive cuts can be made only from carcasses that are thoroughly cooled. 1/

CUTS OF PORK



CUTTING THE CARCASS

. . . .(see chart). . . . Cut off the head about one-half inch behind the ear or at the atlas joint. This may be done before or after splitting. Lay the carcass, skin side down, on a table and cut off the feet just above the knee and hock. Make a square cut between the third and fourth ribs to cut off the shoulder. Take out the neck bones and ribs. Cut off the upper part of the shoulder, or "Boston," two fingers below the shoulder blade. The layer of fat on top, called the "clear plate," may be cut off and used for lard or cured for "bean pork." The Boston may be cooked fresh as a roast or chops, cured, or boned and used for sausage. The lower part, or "picnic," may be boned for sausage or cured. The entire shoulder may be cured without division, but more satisfactory results will be obtained by separating it into Boston, clear plate, and picnic.

Cut off the ham about three fingers in front of the pelvic or "H-bone," holding the saw perpendicular to the line of the hind leg. Then trim the ham smooth so there are no loose, thin, ragged shreds of meat on it. Also trim off the tail and flank. If the ham is very fat, trim off some of it, but be sure to leave about one-half inch over the lean. Hams are usually cured. Strip off the leaf fat for lard. Cut the back (loin and fat back) from the belly by sawing across the ribs parallel to and just below the backbone, where the shoulder was removed, and just below the large muscle, where the ham was removed. Then remove the "fat back" from the loin with a sharp knife, leaving a thin layer of fat over the back muscle. The fat back is used for lard. The loin may be used for roasts or cut up into chops. It may be frozen and used as needed, as it will keep indefinitely while frozen. In thin hogs, the fat back may be left on the loin, the backbones and ribs removed, and the boneless back cured as Canadian-style bacon.

Cut the spareribs from the belly and use them fresh. Then trim the belly so that all corners are square, all edges are straight and all ragged meat is removed. Trim off enough meat from the lower edge to remove the nipples. The front or brisket and the upper part of the belly are not so good as the lower flank and side portions. Hence they are often cut off and used for sausage and lard. The trimmed bellies are cured for bacon. All fat trimmings should be used for lard and lean trimmings for sausage. Do not use any bloody trimmings. 2/

CURING PORK

Two general methods of curing meat are commonly practiced; brine curing and dry curing. Either should give satisfactory results. The dry cure is somewhat faster than the brine cure, but when the meat is subjected to severe temperatures many prefer the latter method.

SUGAR CURED PORK (BRINE METHOD)

For each 100 pounds of meat use

10 lbs. salt — 2 oz. saltpeter
3 lbs. brown sugar — 5 gal. water

The salt, sugar, and saltpeter should be mixed and dissolved in one gallon of boiling water, allowed to cool, and 4 gallons of boiled water added.

Common hardwood barrels, thoroughly sterilized, are the most desirable containers for home curing. The meat should be packed with the skin side down except the top layer, beginning with the hams and finishing with the bacon. The meat should be covered with a round hardwood cover which will go inside the barrel and this should be weighted with hard-burned tile. Do not use a pine top nor lime-stone nor iron for weights. Be sure that the meat is covered with the brine. Allow meat to cure three days for each pound in the hams and shoulders and one day for each pound in the bacon pieces. The meat should be kept in a cool place, but where the temperature remains above freezing. The ideal temperature at which to cure pork is about 36 degrees F. The meat should be removed from the brine and repacked in the same brine on the seventh day. Repeat this on the fourteenth day to acquire a quicker and more complete cure. At the end of the curing period, wash the meat in lukewarm water, hang to drip, dry and smoke. Example; a 15-pound ham is cured in 45 days and a 12-pound bacon in 12 days.

SUGAR CURED PORK (DRY METHOD)

For each 100 pounds of meat use: 8 lbs. salt, 3 lbs. brown sugar and 2 oz. saltpeter. Rub half the mixture thoroughly on the pieces and pack. At the end of five days rub on the remainder of the cure. Cure the meat for two days for each pound in the hams and one day per pound for the bacons. Remove from cure, brush and smoke.

The following variation of the dry cure may be used. For each ham or shoulder from a 250-pound hog use: 1 pint of good salt, 4 tablespoons brown sugar, 1 tablespoon black pepper, and 1 scant teaspoon cayenne pepper.

Decrease salt one-fourth for bacon pieces. The ingredients should be mixed and warmed in a skillet as warming helps the mixture to adhere to the meat. Spread on a table a piece of heavy glazed wrapping paper of sufficient size to wrap each piece of meat. Place the meat skin side down on the paper and cover with the hot mixture, being careful to press it into the joints and crevices of the meat surface. The meat is wrapped in the paper and each piece placed in a heavy muslin sack, being careful not to shake the mixture from the meat. The pieces should be laid, flesh side up, on a table and allowed to remain a few days before hanging. Do not stack the meat. Care must be taken to have the meat thoroughly cooled but not frozen when the mixture is applied nor allowed to freeze after the mixture is applied until curing is complete. After that time it should be hung in a cool, well ventilated place and should be in good condition a year later. This method eliminates smoking and if meat is smoked it is almost necessary under farm conditions to wrap it in paper and place in muslin bags to avoid losses from insects. 1/

1/ Mo. Univ. Extension Service
2/ Ill. Farmers' Institute

BUTCHERING HOGS

SMOKING CURED MEAT

When the curing process is complete, soak the meat for 30 minutes in water at about 95 degrees F. to remove any surplus cure from the surface.

Smoking adds to the flavor and helps preserve the meat. For smoking, use green hickory if possible, as it produces the most desired flavor. Apple probably ranks next as a desirable wood for smoking, but maple or any other hard wood will generally give satisfaction. Hang the pieces to be smoked so they do not touch. Slow smoking is better than rapid smoking, and there is less danger of causing the meat to drip. Forty-eight hours of continuous smoking may be enough, but if the meat is to be kept until it is well aged, longer and slower smoking is desirable.

Tenderized ham is commercially prepared to satisfy consumer demand for mild, tender cured pork that requires a minimum amount of preparation. The temperature of the packing plant smoke house is raised so as to partially cook the ham during smoking. This practice would not be applicable to hams intended for storage.

In addition to smoking with wood, there are two types of patent smoke products on the market, liquid smoke or pyroligneous acid, and smoked salt. The use of liquid smoke is not recommended, because it frequently imparts an unsatisfactory flavor, and is a poison. If used, the directions should be *closely followed*.

Smoked salt is finding considerable favor with many users, particularly because of its convenience. However, it is a more expensive cure, and does not add quite so much to the keeping qualities of the meat as the regular smoking process. 3/

Under the provisions of the Federal Meat Inspection Act the use of liquid smoke, smoked salt, and like preparations intended to be applied to meat instead of smoking it is prohibited. This will concern only those who expect to sell cured meat. 1/

CUTTING AND BONING YIELDS OF PORK CARCASSES

Approximate Average from Commercial and Research Reports for Moderately Fat Hog Weighing about 225 Pounds on Foot.

Cut	Proportion of Live Weight Per Cent	Proportion of Cut			*Weight Yields Lbs.
		Lean and Fat Per Cent	Bone Per Cent	Skin Per Cent	
Ham	14	85	10	5	31
Shoulder 3-rib	13	86	9	5	29
Loin	10	80	20	......	22
Belly (Bacon)	10	92	......	8	22
Head	7	45	55	......	15
Spare ribs and neck bones	3	50	50	......	7
Sausage	4	......	......	......	9
Feet	2	......	......	......	5
Skin from trimmings	2	......	......	......	......
Fat	14	80 Rend. lard	......	......	30 Rend. lard 22–24
					170 lbs. 75% Dr.

* Approximate weight yields from a 225-lb. live hog according to cutting method recommended. Yields vary in accordance with the conformation and fatness of the hog and the method used in cutting and boning. 3/

SAUSAGE

Trimmings, picnics, Bostons, and other cuts may be used for sausage. The only equipment necessary is a sausage grinder. If the sausage is put into casings, a stuffer attachment may be obtained for the grinder or lard press. Sausage should contain about three-fourth lean and one-fourth fat meat. Cut the meat into small pieces. Season with 2 lbs. of salt and 4 oz. of black pepper per 100 lbs. meat. A little sage or nutmeg or other spices is sometimes added. Grind through the small or medium plate. If casings are used, it will probably be cheaper to buy pork casings from the butcher than to clean the intestines. A pound of pork casings will hold 50 to 75 pounds of sausage. The sausage may be stuffed into muslin bags about 12 inches long and 2 inches in diameter. Smoke for two or three hours. Smoked sausage is very palatable and will keep for some time in a cool place. Sausage may also be canned.

RENDERING LARD

The fat meat should be made into lard. Cut it into one-inch cubes. Pour a little water into a kettle and dump in the fat. The water will help to prevent scorching. Render over a medium hot fire, stirring frequently, until enough fat is rendered out to keep the cracklings from sticking to the kettle. The lard is done when the cracklings are well browned and float to the top and when no steam rises from the boiling lard. Then dip the lard and cracklings into a lard press. A combination press and sausage stuffer can be obtained for a few dollars. Press the cracklings thoroughly and strain the lard through a muslin cloth into lard cans or pails with tight covers. 2/

CANNING MEAT

Pork becomes stale very soon, hence it is desirable to make the sausage and can all the pork that is to be canned as soon as possible after the animal heat is out. All other meats improve in flavor and texture if kept a day or longer. Well finished beef is better if allowed to ripen or age for a week or longer. Veal will ripen and yet show little discoloration or shrinkage if used 3 or 4 days after slaughtering. It is preferable not to let meat freeze if it is to be canned. If the meat does freeze and if it is to be canned, it should be cut or sawed into uniform strips, 1 to 2 inches thick, plunged at once into boiling water, simmered until the color of raw meat has almost disappeared, and then packed and processed.

Home canned meat should be heated to the boiling point and kept there for 10 minutes before it is tasted.

STEPS IN CANNING

1. Wipe the meat with a damp cloth. Do not wash any meat except bloody meat.
2. Cut the meat into uniform pieces of desirable size to serve, leaving only enough fat to give flavor.
3. Heat the pieces in a moderate oven (350° F.) or drop it in boiling water. Heat until all the red color disappears. Cut the meat so there will be two or more pieces to each can or jar. Frying is not recommended because it makes the meat hard and dry and may give an undesirable flavor.
4. Salt to taste, about 1 teaspoonful to a pint of meat.
5. Pack the hot meat into clean tested jars or into tin cans and *cover* the meat with pan drippings, broth, or boiling water, leaving ½ inch head space in glass jars and ¼ inch in tin cans.
6. Remove air bubbles, wipe top of jar, and adjust the lids on glass jars—seal the tin cans. On spring-top jars leave the clamp up, and on mason screw-top jars turn lids tight and then back ¼ inch; with 3-piece lids turn tight, then back ¼ turn; turn 2-piece lids firmly tight.
7. Process immediately. Pint jars and No. 2 tin cans should be processed in a pressure cooker 1 hour at 15 pounds. Process quart jars and No. 3 tin cans 10 minutes longer. If a water bath is used, process 3 hours.
8. Remove from the processing kettle to a warm, dry surface. Tighten mason screw top and 3-piece lids. Push down clamp on spring-type jars. Do not turn 2-piece lids. Set jars apart so they will cool as rapidly as possible without danger of breaking.
9. When cold remove bands from the 3-piece and 2-piece lids, test seals, and label.
10. Store in a cool, dark, frost-proof place. 1/

FREEZER LOCKERS FOR PORK

The cold storage locker provides refrigerated storage space for the farm home. It makes possible the use of fresh frozen pork in quantity with a minimum of risk as compared to home curing. 3/

Chilled pork should be cut into family sized pieces and well wrapped in tough, moistureproof paper before freezing. Cheap oiled paper or ordinary wrapping paper will not prevent undesirable drying. The wrapped fresh meat should be spread so that it will freeze quickly. When the packages are piled together in the locker it is often several days before the center of the pack reaches the desired temperature. Some trouble has been reported when the meat was piled to freeze.

Long storage periods sometimes result in undesirable drying of the exposed lean surfaces of frozen pork and the development of rancidity in the fat. Protecting the pork by proper wrapping and by proper temperatures will tend to delay these developments although normally little trouble is encountered during the first month or so of storage. In general, farm families who use a freezer locker try to dress hogs periodically so that they can consume these limited quantities of frozen pork before it has been in storage more than 3 or 4 months.

Frozen pork is cooked with or without being thawed. Thawed or thawing pork is usually moist on the surface, thus affording ideal conditions for the growth of bacteria and mold. If the meat is to be thawed, it is desirable to thaw it in the refrigerator and to cook it promptly. 4/

WARNING—COOK PORK THOROUGHLY

Man may become infected with a very serious disease called trichinosis through the eating of raw pork. This disease is caused by parasites called trichinae, which are too small to be seen by the naked eye but may be present in the lean meat of hogs. The danger of trichinosis may be entirely avoided by cooking pork thoroughly. 4/

SOAP MAKING

Surplus fat and fat that has become old and rancid can be used for making soap. The fat should be heated until it is all melted. To every 7 lbs. of melted fat add 1 lb. of lye dissolved in three pints of water. The fat should not be too hot. About 110 degrees Fahrenheit is good. The water and lye should not be over 80 degrees Fahrenheit. Pour the lye and water mixture into the fat and stir constantly until the mixture resembles honey. Pour the hot soap into a granite pan or into wooden or cardboard boxes, and allow to cool until almost hard. Then cut into squares. The soap should ripen for at least a month before it is used. 5/

1/ Mo. Univ. Extension Service
2/ Ill. Farmers Institute
3/ Ohio Univ. Extension Service
4/ U.S.D.A.
5/ Texas A & M

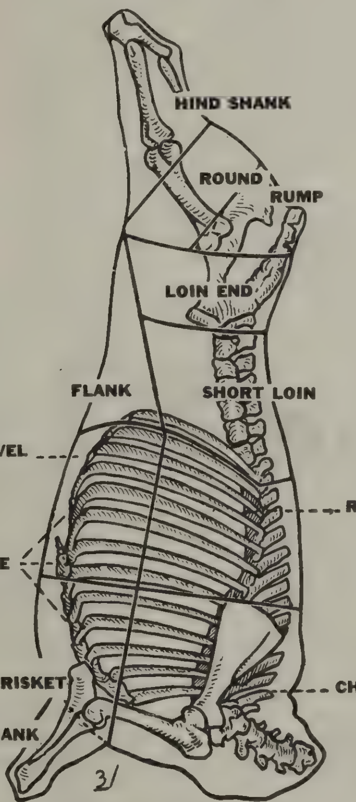
BUTCHERING BEEF

IT IS IMPORTANT that only healthy cattle be slaughtered for beef. A bright eye, sleek coat of hair, and vigor are indicative of health. Cattle should be at least moderately fat, as the meat from a thin animal is less nutritious and palatable. An animal of beef breeding will generally yield the most desirable beef. The meat from such an animal, in good condition, will ordinarily be well marbled; that is, each of the bundles of muscle fibers will be surrounded by a covering of fat, and there will be a rather smooth, even layer of fat over the outside of the carcass just under the hide. The fat of most dairy-bred animals, on the other hand, is not uniformly distributed throughout the meat, but appears on the outside and the inside of the carcass.

The dressing percentage (per cent of dressed beef to live weight of animal) for beef cattle varies from approximately 45 to 68 per cent. Steers grading from medium to good should yield from 53 to 56 per cent dressed meat.

Cattle should not be fed within 24 hours of the time they are to be slaughtered, but should have access to fresh water. An animal should never be killed while in an excited or overheated condition, as it will not bleed well. Beef from animals not properly bled does not keep well.

CUTS OF BEEF



Bruising the body just before slaughter will cause bloody spots, which have to be trimmed out, resulting in considerable waste.

STUNNING —The killing should be done where the carcass is to be hoisted. First, tie the head securely in a position that will enable a man to stun the animal by a blow on the forehead, with an ax or sledge. . . . . The proper place to strike is just above the center of the forehead.

BLEEDING —It requires skill to stick an animal properly. Stretch the neck out as far as possible, holding it in position with one foot against the jaw. . . . . With the sticking knife, cut through the skin from the breastbone toward the throat, making a cut about 10 to 12 inches in length. Insert the knife with the back of the blade against the breastbone and point the tip directly toward the backbone at the top of the shoulders, just under the windpipe, and cut forward toward the head. 1/

CUTTING THE CARCASS

QUARTERING. After dressing the beef carcass, split it down the center of the backbone into two sides. Allow the carcass to cool at least 48 hours. Quarter or "rib down" the sides. A side of beef has 13 ribs. Insert a knife between the 12th and 13th ribs and cut from the backbone to about eight inches from the underline of the carcass. Make this cut along the line between the ribs, as shown on the carcass. . . . . . Then saw the backbone so the front quarter hangs from the flank. While one person holds the front quarter, cut it from the flank.

CUTTING THE FOREQUARTER Lay the forequarter on a table with the outside of the carcass up. Saw off the foreshank just above the elbow joint, removing it from the brisket just beneath with the knife. Saw the plate from the ribs and chuck from a point halfway between the backbone and the bottom of the plate at the rear end of the quarter to the point where the shank was removed. Count forward seven ribs from the rear end of the plate and cut between the ribs and through the breastbone. The rear portion is the navel and the front portion is the brisket. To separate the ribs and chuck, count forward seven ribs and cut between the ribs. Use the saw to cut only through the tip of the shoulder blade and the backbone. The rear portion is the ribs and the front portion is the chuck.

CUTTING THE HINDQUARTER Lay the hindquarter with the inside up. First remove the kidney knob or suet with a knife, taking care not to cut into the tenderloin just beneath. Remove the waste fat on the inside of the rump at this time. Next remove the flank, cutting off the cod (steer) or udder (heifer) with it. Then cut the cod or udder from the round and separate the flank from the round, following the natural seam between them. Be careful not to cut into the round. Then make a straight cut direct from the round to a point about halfway between the backbone and the lower edge of the front end of the flank. Separate the loin from the round and rump. To make this cut, begin at the backbone where it starts to rise toward the tail and count four bones toward the tail. Mark this point with the knife or saw. Mark another point about two fingers in front of the H-bone (the bone just below the bung gut in the live animal). Then place the saw blade on these two points and saw through the backbone and the hip joint. Complete the separation with the knife. Remove the rump from the round by cutting with the knife just below and parallel to the H-bone down to the femur or thigh bone. Saw through the femur and complete the cut with the knife. Allow the rear shank to remain on the round for convenience in cutting round steaks. Turn the loin with the outside up and divide it into the loin end and short loin. Make this separation just in front of the hook bone, which may be located by a narrow-bladed knife or ice pick. After locating the front edge of this bone, cut with a knife parallel to the rear end of the loin. Complete the separation by sawing through the backbone.

THE RETAIL CUTS The round may be used for steaks, swiss steaks and pot roasts. The lower part or heel may be used for hamburger and stew meat. The rump supplies excellent pot roasts. The loin end is used for steaks (sirloin), which rank next to club steaks in quality. The short loin also is used for steaks. The steaks which contain the tenderloin are porterhouse, or T-bone. These are the best in the beef carcass. Those which contain no tenderloin are the club steaks. They rank second to porterhouse in quality.

The flank contains one flank steak, a fan-shaped muscle which points toward the cod or udder. Strip this muscle out for steak and trim the lean from the remainder of the flank for stew meat and hamburger. The ribs furnish the best roasts. They also may be used for steaks. Cut off the first two ribs (from the rear) of the chuck and use them for pot roasts. Then cut thin slices for steaks or thick slices for pot roasts crosswise from the arm (the part just above where the front shank was removed) until the shoulder knuckle (where the arm bone fits into the shoulder blade) is reached. Cut pot roasts or chuck steaks from the remainder of the chuck, making the cuts parallel to the ribs and crosswise to the shoulder blade until the knucklebone is reached. The knucklebone, if cracked

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1/ U.S.D.A.
2/ Mo. Univ. Extension Service
3/ Ill. Farmers' Institute

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

BUTCHERING BEEF, VEAL, LAMB AND MUTTON

or sawed, is an excellent soupbone. Use the neck for stew meat, mincemeat, or hamburger. The plate (navel and brisket) generally is used for stewing. It is very good with noodles or dumplings. Short ribs may be cut from it for braising. It may also be boned and rolled and made into corned beef. Saw the front and rear shanks into small sections across the bone for soupbones or trim them for hamburger. Any bones remaining may be sawed and used for soup stock.

CORNED BEEF The cheaper, fatter cuts, such as chucks, rumps, navels and briskets, are often corned. The U. S. Department of Agriculture in Farmers' Bulletin 1415 gives the following directions for corning beef: "Cut the beef into 4 or 6 inches square. These pieces should be of uniform thickness so that they may be packed in even layers in the barrel. When the meat is thoroughly cooled it should be corned as soon as possible, for meat which has begun to spoil is unwholesome and will probably sour during the corning process. Under no circumstances should meat be put in cure while in a frozen condition.

"Weigh the meat and for each 100 pounds allow 8 pounds of salt; sprinkle a layer of salt one-quarter of an inch in depth over the bottom of the vessel (a stone jar or wooden barrel which has been thoroughly cleaned and scoured is preferable); pack the cuts of meat as closely as possible, making a layer 5 or 6 inches thick then add alternate layers of salt and meat, being careful to cover the top layer of meat with considerable salt. Allow the salted meat to stand overnight; then add a solution composed of ingredients in the following proportion: For 100 pounds of meat use 4 pounds of sugar, 2 ounces of baking soda, and 4 ounces of saltpeter dissolved in 1 gallon of lukewarm water. Mix thoroughly and pour over the meat. Then add 3 gallons of water. Keep the meat entirely under the brine by using a loose board cover with a weight on it. If any of the meat projects it causes the brine to spoil in a short time. If the meat has been corned during the winter and must be kept into the summer season, it is advisable to watch the brine closely during the spring, as it is more liable to spoil at that time than at any other season. If the brine appears to be ropy, the pieces of meat should be removed and vigorously washed with a stiff brush and hot water, then repacked and covered with new brine. The brine should be kept in a cool place, as the sugar in the brine has a tendency to ferment. To cure thoroughly the meat should be kept in the brine 28 to 40 days. Meat removed from the brine should be hung up and allowed to drain thoroughly before wrapping or smoking." 3/

MAKING HAMBURGER—Grind lean beef, such as the round, neck flank, and trimmings, and a little fat, in a sausage grinder. If desired, a small amount of bacon may be put in for flavor. For seasoning, about 1 pound of salt and 4 ounces of pepper are sufficient for 50 pounds of meat.

BUTCHERING VEAL

Most veal is produced in this country from calves between 1 and 3 months old, weighing from 75 to 150 pounds.

Stun the calf before sticking it (as in killing cattle), but the blow need not be heavy. The work is made easier if the carcass is hoisted to a convenient height before skinning. Wash the hide and split the skin from head to tail, following the middle line of the belly. If the carcass is to be cut on the farm, the hide may be removed at once, as the carcass can be skinned more easily while it is still warm. Use a knife to start the skin, then "fist" off the hide. Remove the offal and split the breastbone and pelvis, as described for beef. In case the veal is to be shipped, the hide should be left on, to preserve the light color and prevent the carcass from drying out.

A plain-dressed calf carcass dries out more rapidly than a "caul-spread" carcass. The latter consists in removing the hide and spreading the caul over the hind quarters. The caul is the thin sheet of membrane extending from the stomach over the intestines. 1/

BUTCHERING LAMB – MUTTON

Although lamb and mutton have not been widely used in many farm homes in the past, these meats are now taking on a new significance because of the widespread shift to pasture farming and the increased use of sheep as factors in soil conservation. Lambs and yearlings raised on the farm provide a needed variety of highly nutritive fresh meat.

A season particularly well adapted to the utilization of fresh lamb and mutton is late autumn, before the weather is cold enough for the slaughter of hogs. Even in the summer months, with modern household refrigeration, it is possible for a family to utilize a lamb entirely in the form of fresh meat.

Home produced lamb can thus be included in the family's annual food supply plans, furnishing another variety of choice meat when fried chicken and ham have lost some of their glamor and before the advent of fresh pork. Lamb takes less time to prepare than chicken and is especially desirable when cooking for a large group, as for threshers.

COOLING THE CARCASS

Prompt chilling and storage at correct temperatures are necessary for the proper ripening of lamb and to prolong the period in which it is available for family use in the form of fresh meat.

The ideal temperature for chilling the freshly slaughtered carcass is 34° F. Below 40° and above 32°, if possible, is best for chilling and ripening.

If natural temperatures are low, an effort should be made to protect the meat from freezing so that the ripening process will not be delayed or stopped.

A clean carcass, protected by dry, unbroken fell or fat will keep for a longer time than thin meat or meat that has been contaminated in dressing or gashed so that the moist meat is exposed.

When lamb is to be kept longer than 2 or 3 weeks the chilled storage of a refrigerator will not be satisfactory. For best results it should be canned or frozen and stored in cold storage lockers after the cuts are properly wrapped in a good grade of waxed locker paper to exclude air and retard evaporation. Or it may first be wrapped in moisture and water resistant cellophane and then wrapped in locker paper.

CUTTING THE CARCASS

A safe rule in cutting meat is to cut thick meat from thin meat and fat meat from lean meat. With that principle as a guide remove the thin portions, such as the breast, flank, plate, brisket and foreleg, on a line beginning at the front part of the hind leg and running to a point where the foreleg and breast meet. Saw through the ribs and lower part of shoulder. These parts may be used for stews but the breast of a choice or prime lamb is often used as a pocket of lamb. Better still is to remove the bone from this first, cut, roll and tie it. It is so much more attractive on the table and can be carved so much more readily.

To slice the neck of lamb, insert the knife where the neck joins the shoulders, cutting it off on a line with the lamb back. Neat slices are then made by cutting the meat with a knife and sawing the bone.

Making a five-rib shoulder, a regular rib cut, loin, and a long-cut leg. Note that the breast and neck have been removed

The completed neck slices are used for braising, stewing, or en casserole.

A full-size shoulder roast is cut off between the fifth and sixth ribs. Then separate the back from the legs by cutting just forward of the hip bones. The loin and rib cuts need not be separated from each other until cut into chops.

The loin cuts are made into chops by first splitting the backbone down the center and slicing the chops cross-wise of the bone. The chops are cut one inch thick. 2/

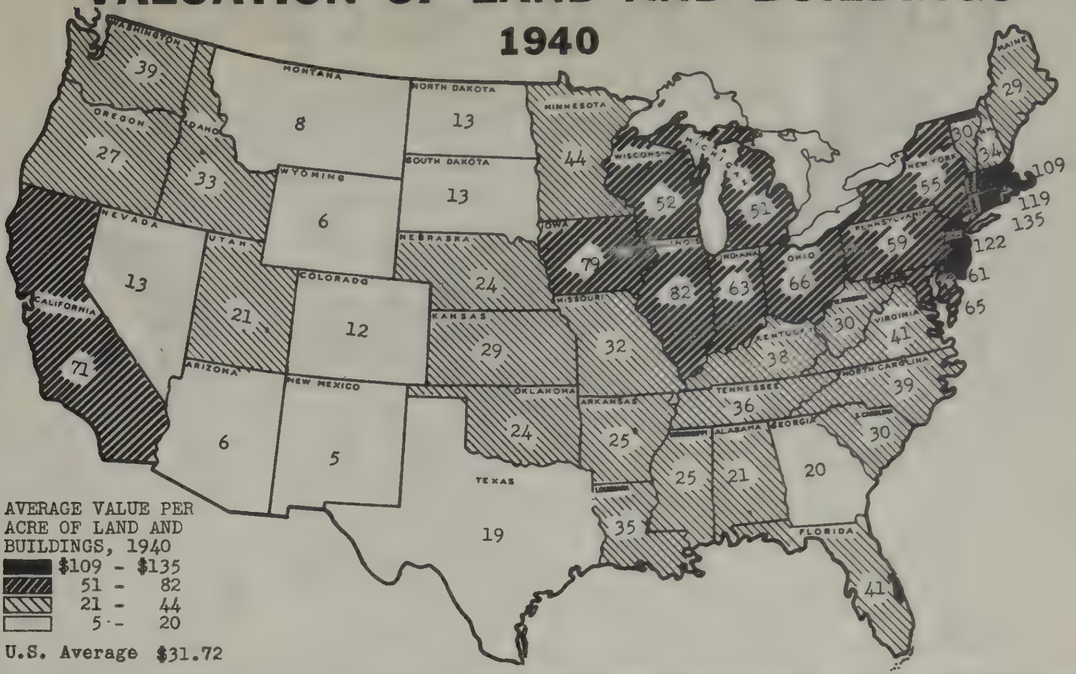
Splitting the cuts down the center of the backbone. The cuts shown are, (A) shoulders, (B) ribs, (C) loins, and (D) legs.

300 Farm Values, Improvements

300 Farm Values, Improvements

VALUATION OF LAND AND BUILDINGS

1940



There are such extreme variations in real estate values within each state that average state figures are too generalized for great local significance. They do, however, have value for comparative purposes.

During the 10 years from 1930 to 1940, according to the estimates of landowners as recorded by the census, real estate values declined approximately 29.7 per cent, or $2095 per farm. The average value per farm in 1940 was $5518 as compared with the $7613 of 1930.

However, although the average land value was lower in 1940 than in 1930 it was slightly above that of 1935. In 29 states there were increases in average real estate values, decreases in 14 states, and little or no change in 5 states during the five years, 1935-1940. The West North Central States showed the most extreme decline in land values during the 10 years, 1930-1940, or a decrease of 42 per cent.

When interpreting changes in per-acre values, consideration should be given to the fact that the increasing additions of low-value western lands tend to decrease average values in the West. Conversely, the abandonment of low-producing land in the East, has, statistically if not actually, tended to increase the average per-acre value of the remaining farm land of that area.

The real estate value maps strongly emphasize the fact that farm values are dominated territorially by the productive ability of the land and/or proximity to urban and industrial centers. Witness the comparatively high values in Iowa and Illinois and through the densely populated states to the east.

Of great interest and speculation is the probable trend of farm real estate during and after the present war in Europe. In brief, present land value situations, varying in many respects from those in 1914, which are likely to have a curbing influence on value increases are:

1. Land needs are not so pressing as in 1914. The maximum population will be reached in the next 25 years.

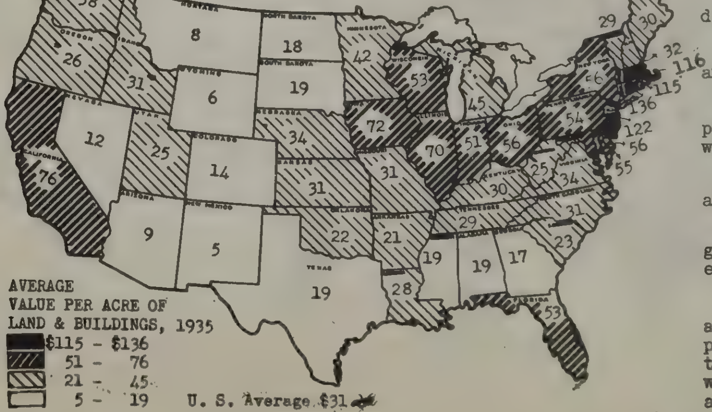
2. Change in confidence in land investment. The present war follows two decades of falling land values, while in 1914 land values had been rising for about two decades and rising land values were expected.

3. A large supply of land is now available to purchasers. This consists mainly of holdings of erstwhile lenders and accumulating lands in estates and in hands of elderly farmers.

4. Higher cost levels.

5. Increased rates of current returns are demanded on investments in land.

AVERAGE VALUE PER ACRE OF LAND AND BUILDINGS
1935



Based on Census & Data of U.S.D.A.

Influences which were not present in 1914 and that may support land value increases are:

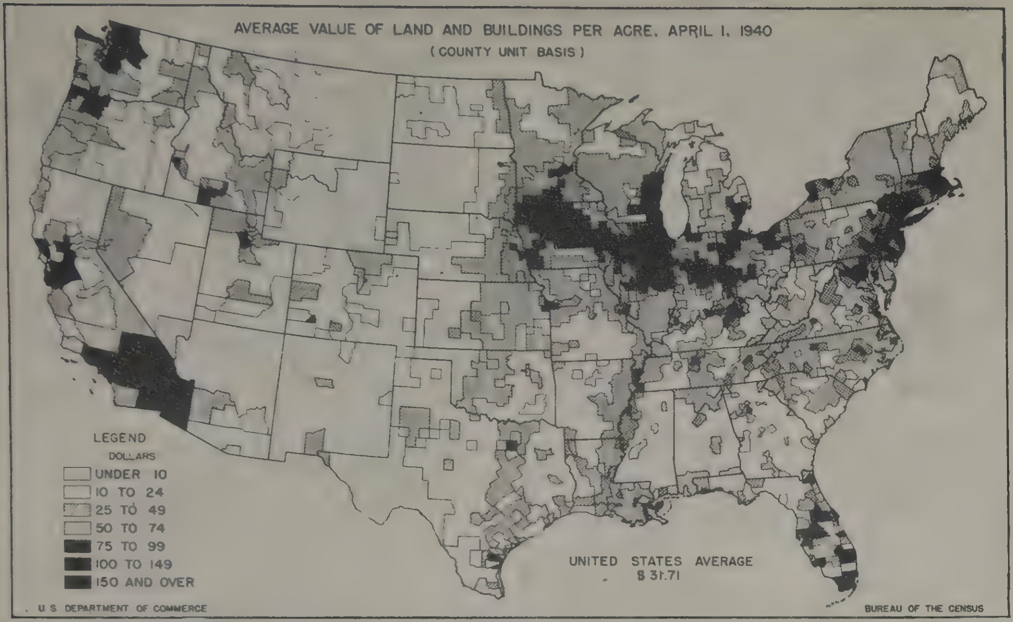
1. Expectation of values and prices to repeat, at least in part, the World War reactions with reference to higher prices and values.

2. Attitude toward inflation - more persons are inflation-minded.

3. Lower interest rates on farm mortgages, greater supply of mortgage credit, and lower equity requirements.

Prices of farm products are again advancing and land values follow the trend of farm product prices. Although the changes since 1914 will tend to curb land value increases, land prices will not remain down if other prices continue to advance.

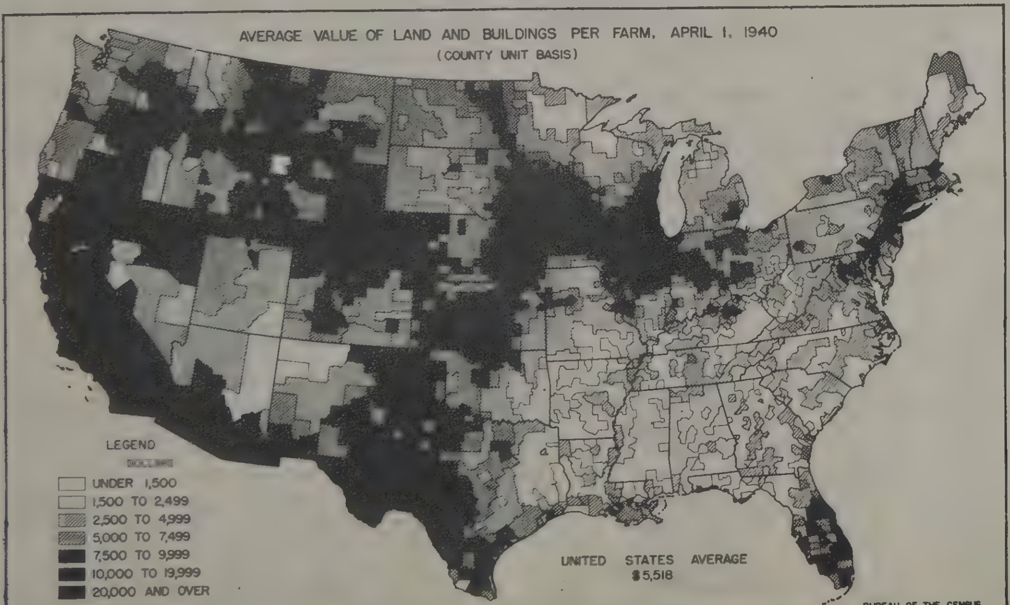
VALUE OF FARM REAL ESTATE



Highest per acre land values are found primarily in small areas near large cities or in areas of intensive types of agriculture such as in the Florida Peninsula, portions of Californis, fertile valleys of the Appalachian Mountains, and the North Pacific region.These are areas especailly favored by local circumstances and frequently are areas with high improvement investments for such items as irrigation and drainage.

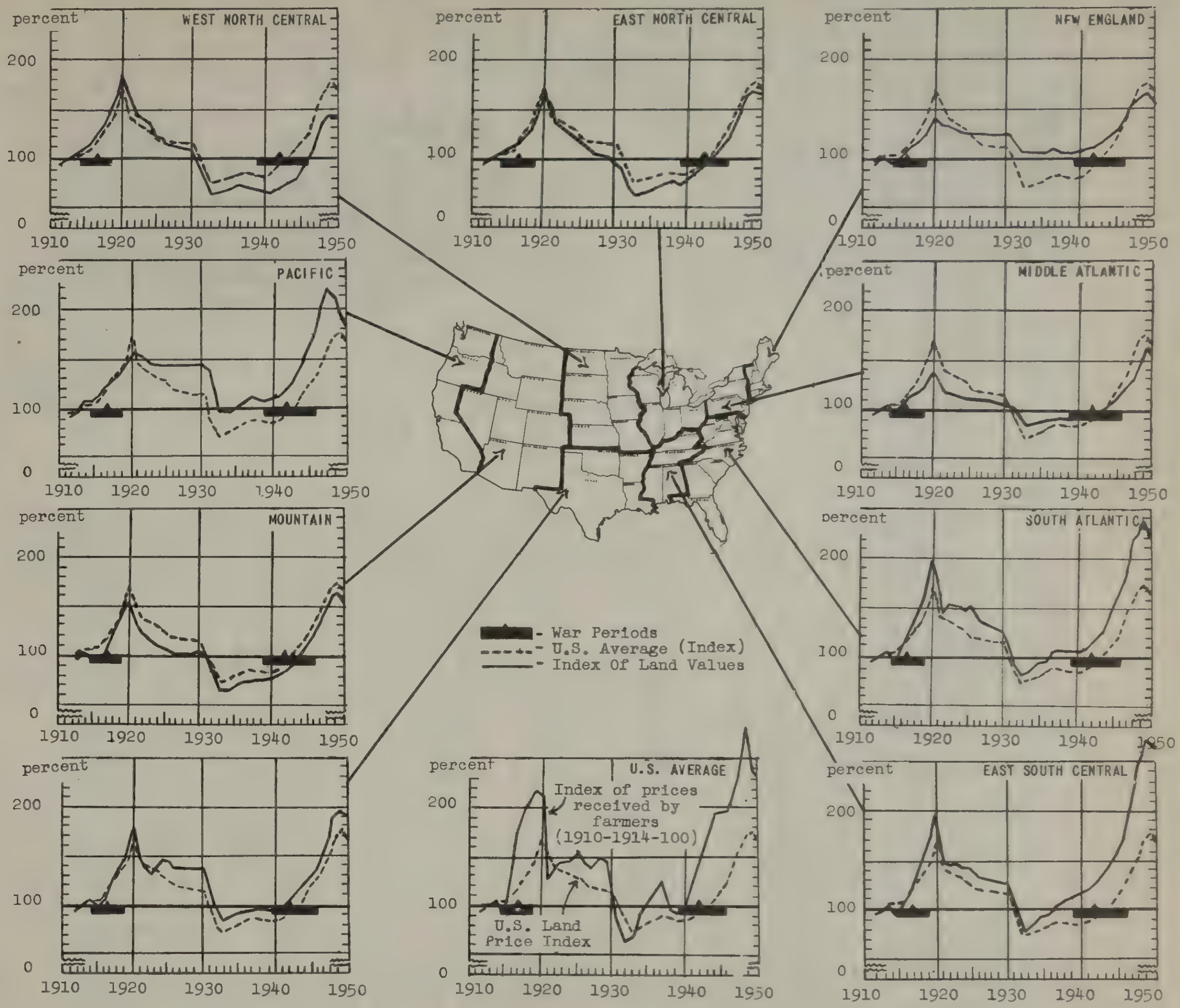
Value of farm real estate per farm presents a picture entirely different to that of the value per acre. The type of farming practiced directly affects the size of the farm, the buildings and fencing, and hence the total investment per farm.

Although significant changes in farm real estate values are constantly taking place, the general relationship between major regions tends to be maintained. With increasing age, it is probable that these relationships will become even more permanently fixed than at present.



FARM LAND PRICES--CONTINUE SLIDING

INDEX OF LAND VALUES, 1912 - 1914 = 100 (Values as of March 1)



FARM LAND PRICE TRENDS

Farm land prices are continuing their slow walk downhill. However, a strengthening in land values in the four month period from November to March kept the index of farm real estate value for the United States from any large drop.

As compared to March 1, 1949, the average value of farm real estate this March had dropped 3 per cent. Prices are now 5 per cent below November, 1948. Stable to slightly higher prices for many farm products and improvements in general business conditions since the first of the year helped to check the decline.

The decline in the year ending March, 1950 was less than 5 per cent in over half the states. Compared with post-war peaks, however, land values have now declined 10 per cent or more in 8 states, most of which are in the Mountain and Pacific Coast regions. There has been no drop in values as yet in Minnesota, Iowa, Missouri, Illinois and North Carolina, but the gains in those states during the last year were limited to 3 per cent or less. Larger than average drops were recorded in these states. West Virginia, down 9 per cent; Washington, Oregon, Main and Georgia each down 7 per cent.

The farm land price trend is expected to be downward in 1950. This is based on the decline in volume of sales, the lower net farm income and business activities. Voluntary sales are down 36 per cent from the 1947 peak.

Buying Land? -- This is not the best time to buy farm land. As prices break further, you will have more farms to pick from and you can get better terms. If you have enough cash to pay at least 50 per cent down and have a chance to buy a good farm that is not over-priced -- go ahead, provided you will have enough money left with which to operate it and still have something left for emergencies. Do not tie yourself down to an inefficient operation.

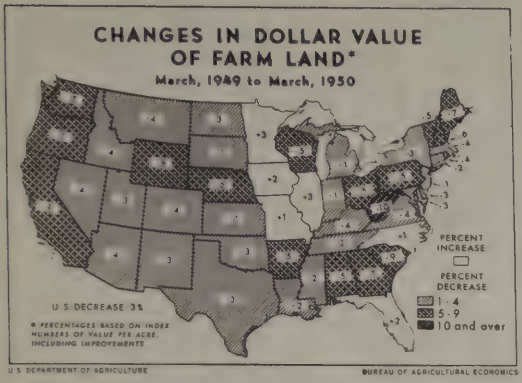
Selling Land? -- Marginal and low producing farms should be sold, even at a sacrifice. Sale of other farms which must be sold within the next five years should also be pushed Productive land is a good investment and "continues to be th nearest certainty known".

Prices change but good land continues to have value. Land is a good hedge against possible further inflation.

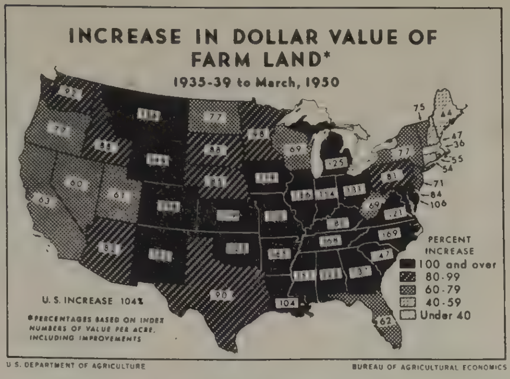
Based on data of USDA

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

PRICE TRENDS OF FARM REAL ESTATE


CHANGES IN DOLLAR VALUE OF FARM LAND*
March, 1949 to March, 1950
PERCENT INCREASE
PERCENT DECREASE
1 - 4
5 - 9
10 and over
U.S. DECREASE 3%
* PERCENTAGES BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS


INCREASE IN DOLLAR VALUE OF FARM LAND*
1935-39 to March, 1950
PERCENT INCREASE
100 and over
80-99
60-79
40-59
Under 40
U.S. INCREASE 104%
*PERCENTAGES BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS

U.S. DEPARTMENT OF AGRICULTURE
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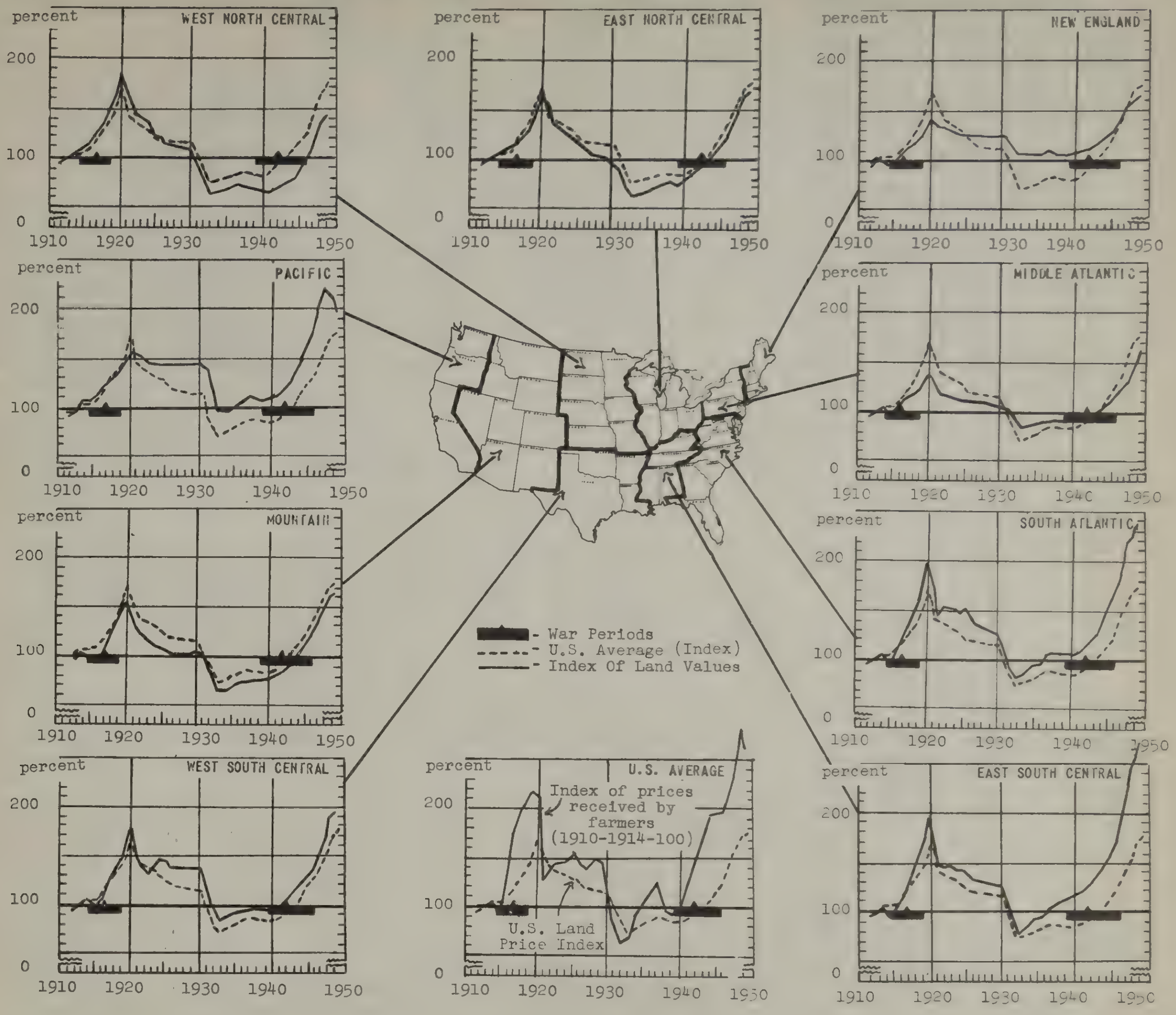
INDEX NUMBERS OF ESTIMATED PRICE PER ACRE, BY GEOGRAPHIC DIVISIONS

1912-1914 = 100 Per Cent

State and Geographic Division	1912	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	. .	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43	'44	'45	'46	'47	'48	'49	'50
Maine	100	102	98	96	98	110	115	124	142	132	127	129	127	124		124	123	111	94	94	94	95	97	96	94	95	95	97	99	112	119	125	134	138	147	137
New Hampshire	97	101	102	101	98	103	111	116	129	123	126	111	109	111		111	110	102	92	91	90	92	94	93	93	94	95	97	100	107	117	122	136	142	144	136
Vermont	101	101	98	104	115	127	133	136	150	150	145	134	130	125		123	121	112	101	100	101	101	102	100	100	101	101	102	110	119	129	144	166	171	185	176
Massachusetts	98	100	102	98	100	110	114	119	140	134	134	132	131	132		131	130	120	112	112	111	111	112	113	113	113	113	114	115	125	133	141	145	154	159	152
Rhode Island	100	101	100	102	106	112	118	123	130	130	127	124	126	128		134	126	118	118	118	118	119	120	119	118	120	121	126	127	139	144	159	174	183	191	184
Connecticut	98	100	102	100	102	110	116	121	137	134	140	137	140	137		140	140	133	124	123	123	125	126	124	124	124	128	133	134	144	150	166	186	193	195	191
New England	99	101	100	99	102	112	117	123	140	135	134	130	128	127	. .	127	126	116	105	104	104	105	107	106	105	106	107	109	112	122	130	140	152	159	166	158
New York	98	100	102	100	103	109	115	118	133	123	116	115	112	111		103	96	92	82	82	84	85	86	87	86	86	86	87	97	101	109	120	138	142	155	151
New Jersey	98	100	102	100	102	111	115	119	130	130	121	115	120	124		125	123	118	110	111	111	113	115	116	116	116	121	128	136	141	151	164	185	186	196	195
Pennsylvania	98	100	102	100	105	114	119	124	140	131	120	118	116	114		107	101	96	78	79	82	86	87	89	88	90	90	95	104	111	123	130	143	154	165	157
Middle Atlantic	98	100	102	100	104	112	117	121	136	127	118	116	114	114	. .	106	101	96	82	83	85	88	89	90	89	90	91	94	103	109	119	128	144	151	162	157
Ohio	98	100	102	107	113	119	131	135	159	134	124	122	118	110		90	82	70	59	63	66	71	75	74	76	77	80	89	97	111	121	140	158	166	175	167
Indiana	97	100	103	102	110	116	128	135	161	148	120	116	108	102		80	72	60	53	56	61	66	70	73	73	74	77	88	98	112	124	145	158	172	176	174
Illinois	97	100	103	102	105	111	119	130	160	153	126	123	116	115		91	80	66	54	59	61	65	70	73	72	75	76	86	91	105	112	124	141	150	158	162
Michigan	98	99	103	105	111	120	134	137	154	152	148	145	138	133		121	115	97	80	82	83	84	91	92	92	91	93	105	115	134	145	167	194	198	202	199
Wisconsin	97	100	103	104	117	124	133	143	171	168	154	147	139	130		117	104	91	80	80	82	84	89	88	86	84	82	88	92	102	110	120	135	145	152	145
East N. Central	97	100	103	104	110	116	127	135	161	151	132	128	121	116	. .	96	87	73	62	65	68	72	76	78	77	78	80	89	96	110	119	134	152	161	168	166
Minnesota	95	100	105	107	122	138	155	167	213	212	187	177	170	159		133	116	98	79	83	83	85	87	88	86	86	86	90	100	110	115	129	143	157	164	169
Iowa	96	99	104	112	128	134	145	160	213	197	162	156	143	136		113	98	80	58	63	67	73	73	74	74	74	75	80	87	101	107	121	134	150	154	157
Missouri	97	100	103	102	108	115	125	137	167	156	133	127	117	112		92	79	67	55	57	58	60	60	60	58	59	60	66	74	82	91	102	113	116	123	124
North Dakota	97	100	103	103	112	118	124	130	145	141	136	128	114	109		95	85	73	66	68	67	68	67	64	57	52	52	55	58	70	76	83	92	110	118	114
South Dakota	96	101	103	101	108	116	126	145	181	173	146	126	117	115		93	83	67	55	55	54	55	54	51	44	41	40	42	47	57	62	68	77	91	98	97
Nebraska	98	100	102	101	104	110	127	145	179	166	144	139	128	123		113	106	90	69	72	72	73	72	69	65	68	55	59	64	77	86	96	108	126	139	130
Kansas	101	99	99	103	109	115	122	132	151	149	130	127	118	115		113	103	89	70	72	73	75	78	78	76	71	71	74	84	96	111	120	140	163	169	167
West N. Central	97	100	103	105	114	122	134	147	184	174	150	142	132	126	. .	109	97	81	64	67	68	71	71	70	67	65	65	69	76	80	96	106	119	135	142	141
Delaware	100	101	99	100	105	115	124	129	139	129	119	119	107	112		111	107	95	80	80	82	84	87	89	89	89	93	96	108	111	123	137	160	163	163	158
Maryland	97	100	103	104	109	118	129	136	166	146	141	136	133	131		123	120	106	90	90	91	94	98	101	100	100	105	111	124	136	147	165	196	201	206	200
Virginia	97	100	103	97	117	125	142	167	189	180	157	170	162	154		134	117	99	88	91	97	103	110	111	110	112	115	118	131	146	171	200	224	226	246	235
West Virginia	97	100	103	101	104	112	122	135	154	141	125	127	125	120		105	98	81	74	78	78	82	82	84	85	85	89	90	99	105	106	121	137	149	155	139
North Carolina	97	99	104	102	114	130	152	176	223	196	166	195	192	187		158	135	114	86	101	111	121	132	138	138	138	136	150	161	193	224	268	310	324	341	344
South Carolina	101	98	101	94	98	107	122	162	230	186	126	128	136	138		104	90	73	57	67	76	78	83	87	88	89	95	103	112	136	162	172	196	208	224	204
Georgia	98	101	101	94	105	116	131	172	217	172	136	125	123	116		100	90	70	57	65	72	73	79	79	80	82	87	93	103	120	132	146	173	180	195	182
Florida	96	99	105	97	103	109	126	143	178	176	157	155	163	172		172	166	141	121	126	126	127	134	132	131	133	134	140	150	161	185	204	226	210	206	210
South Atlantic	98	100	103	98	108	119	135	161	198	174	146	152	151	148	. .	128	116	96	80	87	93	97	104	106	106	107	110	117	127	145	166	189	217	223	236	228
Kentucky	97	100	103	100	111	127	146	170	200	172	151	147	141	140		127	115	97	80	81	87	89	98	103	107	113	114	129	147	165	189	221	264	264	284	274
Tennessee	96	100	104	100	110	121	145	168	200	169	154	158	148	137		123	114	96	79	84	91	97	100	102	104	108	113	123	139	160	177	213	243	258	271	265
Alabama	98	98	103	98	98	103	128	143	177	147	135	143	144	154		143	129	102	88	99	110	114	116	123	122	122	125	129	139	160	180	208	247	252	275	261
Mississippi	97	102	102	97	111	121	131	155	218	150	148	143	134	136		122	112	92	73	82	90	92	97	106	106	106	111	122	133	145	165	196	216	238	251	246
East S. Central	97	100	103	99	109	120	140	162	199	163	149	149	142	141	. .	128	117	97	79	85	93	96	102	107	109	112	115	126	141	159	179	212	246	256	273	264
Arkansas	98	101	101	95	109	129	149	169	222	186	174	170	160	160		141	118	104	80	86	88	92	92	97	95	95	100	111	123	141	167	180	214	235	260	246
Louisiana	99	102	99	95	106	112	143	157	198	163	140	144	137	141		132	121	103	89	96	103	104	108	117	117	121	121	129	145	154	162	175	205	202	230	225
Oklahoma	98	101	101	95	104	114	130	140	166	160	139	133	125	131		127	116	94	76	83	86	91	91	94	93	93	96	101	111	120	131	156	169	189	211	205
Texas	95	100	105	103	103	115	133	141	174	156	133	128	137	146		138	122	96	83	88	91	94	96	99	97	99	98	105	109	124	137	150	165	187	187	182
West S. Central	96	100	104	100	103	116	134	143	177	159	136	132	136	144	. .	136	121	97	82	88	91	94	96	99	97	99	99	105	112	125	139	154	170	190	197	191
Montana	97	100	103	100	94	100	106	114	126	105	96	87	81	75		72	70	58	48	48	50	53	54	53	54	55	57	62	69	80	89	102	117	129	130	125
Idaho	100	101	99	96	99	114	130	146	172	162	136	133	129	123		116	114	96	76	77	80	83	86	85	85	86	87	94	106	124	140	153	160	168	165	158
Wyoming	97	103	100	103	94	97	121	147	176	146	134	121	112	100		98	95	77	62	62	62	65	66	66	66	68	71	78	88	102	115	132	147	168	169	159
Colorado	98	103	98	93	102	107	110	118	141	132	123	113	98	92		83	81	65	54	54	53	57	60	60	61	61	63	69	78	93	108	125	141	157	156	149
New Mexico	100	104	96	100	96	111	118	127	144	125	115	110	110	108		110	109	89	75	76	76	80	82	83	83	84	87	95	101	117	132	151	168	181	193	188
Arizona	95	100	105	97	95	105	125	140	165	148	135	124	128	121		123	123	104	90	90	91	94	96	95	94	95	96	102	110	127	145	158	176	181	180	172
Utah	100	102	98	98	104	117	122	144	167	137	133	133	131	130		126	122	98	83	84	84	87	90	89	89	89	89	93	100	112	121	127	136	146	146	141
Nevada	96	100	103	102	99	96	103	117	135	123	119	112	108	102		99	97	78	65	65	65	68	69	69	69	70	71	73	78	87	92	100	104	144	114	109
Mountain	98	102	100	98	98	106	117	130	151	133	122	115	110	105	. .	102	100	82	69	69	70	73	75	75	75	76	78	84	92	107	120	134	149	161	163	156
Washington	98	100	103	100	102	112	118	122	140	132	124	117	115	113		110	108	91	74	73	76	80	84	84	83	84	84	91	101	120	133	153	170	174	168	157
Oregon	97	100	103	99	100	104	112	118	130	130	122	115	113	110		107	106	88	72	72	74	77	82	82	82	84	85	91	99	117	130	143	152	156	152	141
California	93	99	108	111	116	130	136	142	167	168	166	165	164	164		160	158	133	109	110	115	119	124	123	121	121	122	128	141	168	193	219	244	234	215	196
Pacific	94	99	106	107	111	122	129	134	156	155	151	148	147	146	. .	142	140	118	96	97	101	105	110	109	107	108	109	115	126	150	171	194	215	210	196	180
United States	97	100	103	103	108	117	129	140	170	157	139	135	130	127		115	106	89	73	76	79	82	85	85	84	84	85	91	99	114	126	142	159	170	175	169

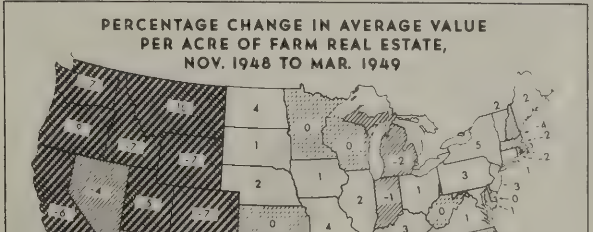
FARM LAND PRICES--PASS THE PEAK

INDEX OF LAND VALUES, 1912 - 1914 = 100 (Values as of March 1)



Farm land prices have passed the World War II inflation peak as predicted in the Digest last fall.

The peak came in November 1948 and prices are now down 1 per cent from that level. As yet the down trend is not nation-wide. (Note the Map) For the year as a whole, from March 1948 to March 1949, land prices advanced 1 per cent. Seven states, led by California, showed declines. Three were unchanged; all others advanced.


PERCENTAGE CHANGE IN AVERAGE VALUE PER ACRE OF FARM REAL ESTATE, NOV. 1948 TO MAR. 1949

PERCENT INCREASE
NO CHANGE
PERCENT DECREASE
1 - 4
5 and over
U. S AVERAGE DECREASE 1 PERCENT
U S DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

The see-saw pattern of farm land price trends is expected to yield to a general price decline in 1949 or 1950. This is based on the continued decline in volume of sales and the growing realization that net farm incomes and business activities are down from last year. Voluntary sales are down nearly a third from the 1947 peak.

Buying Land? -- This is not the best time to buy farm land in most cases. As prices break farther, more farms will be available, and you will be able to make better selection or get better terms. However, prices probably will not break 25 per cent as they did between 1920 and 1925. If you have the cash and have a chance to buy good land that is not over-inflated in price -- go ahead. But, do not tie yourself down to an inefficient operation or take on a big mortgage at this time.

Selling Land? -- Marginal and low producing farms should be sold, even at price concessions. Sale of other farms which must be sold within the next five years should also be pushed. Productive land is a good investment and "continues to be the nearest certainty known". Prices change but good land continues to have value. Land is a good hedge against possible future currency devaluation.

Based on data of USDA

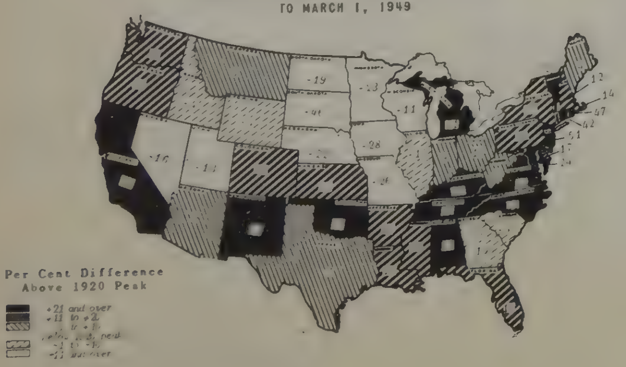
PRICE TRENDS OF FARM REAL ESTATE
INDEX NUMBERS OF ESTIMATED PRICE PER ACRE, BY GEOGRAPHIC DIVISIONS

1912-1914 = 100 per cent

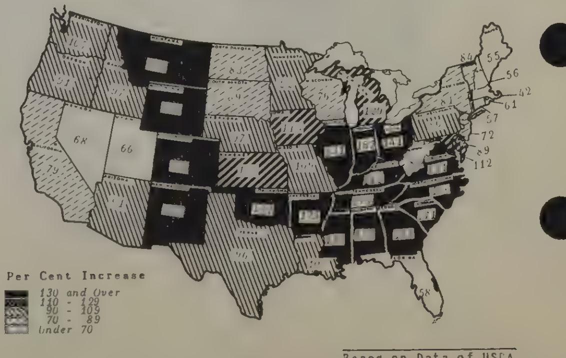
State and Geographic Division	1912	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	. .	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43	'44	'45	'46	'47	'48	'49
Maine	100	102	98	96	98	110	115	124	142	132	127	129	127	124		124	123	111	94	94	94	95	97	96	94	95	95	97	99	112	119	125	134	138	147
New Hampshire	97	101	102	101	98	103	111	116	129	123	126	111	109	111		111	110	102	92	91	90	92	94	93	93	94	95	97	100	107	117	122	136	142	144
Vermont	101	101	98	104	115	127	133	136	150	150	145	134	130	125		123	121	112	101	100	101	101	102	100	100	101	101	102	110	119	129	144	166	171	185
Massachusetts	98	100	102	98	100	110	114	119	140	134	134	132	131	132		131	130	120	112	112	111	111	112	113	113	113	113	114	115	125	133	141	145	154	159
Rhode Island	100	101	100	102	106	112	118	123	130	130	127	124	126	128		134	126	118	118	118	118	119	120	119	118	120	121	126	127	139	144	159	174	183	191
Connecticut	98	100	102	100	102	110	116	121	137	134	140	137	140	137		140	140	133	124	123	123	125	126	124	124	124	128	133	134	144	150	166	186	193	195
New England	99	101	100	99	102	112	117	123	140	135	134	130	128	127	. .	127	126	116	105	104	104	105	107	106	105	106	107	109	112	122	130	140	152	159	166
New York	98	100	102	100	103	109	115	118	133	123	116	115	112	111		103	96	92	82	82	84	85	86	87	86	86	86	87	97	101	109	120	138	142	155
New Jersey	98	100	102	100	102	111	115	119	130	130	121	115	120	124		125	123	118	110	111	111	113	115	116	116	116	121	128	136	141	151	164	185	186	196
Pennsylvania	98	100	102	100	105	114	119	124	140	131	120	118	116	114		107	101	96	78	79	82	86	87	89	88	90	90	95	104	111	123	130	143	154	165
Middle Atlantic	98	100	102	100	104	112	117	121	136	127	118	116	114	114	. .	106	101	96	82	83	85	88	89	90	89	90	91	94	103	109	119	128	144	151	162
Ohio	98	100	102	107	113	119	131	135	159	134	124	122	118	110		90	82	70	59	63	66	71	75	74	76	77	80	89	97	111	121	140	158	166	175
Indiana	97	100	103	102	110	116	128	135	161	148	120	116	108	102		80	72	60	53	56	61	66	70	73	73	74	77	88	98	112	124	145	158	172	176
Illinois	97	100	103	102	105	111	119	130	160	153	126	123	116	115		91	80	66	54	59	61	65	70	73	72	75	76	86	91	105	112	124	141	150	158
Michigan	98	99	103	105	111	120	134	137	154	152	148	145	138	133		121	115	97	80	82	83	84	91	92	92	91	93	105	115	134	145	167	194	198	202
Wisconsin	97	100	103	104	117	124	133	143	171	168	154	147	139	130		117	104	91	80	80	82	84	89	88	86	84	82	88	92	102	110	120	135	145	152
East N. Central	97	100	103	104	110	116	127	135	161	151	132	128	121	116	. .	96	87	73	62	65	68	72	76	78	77	78	80	89	96	110	119	134	152	161	168
Minnesota	95	100	105	107	122	138	155	167	213	212	187	177	170	159		133	116	98	79	83	83	85	87	88	86	86	86	90	100	110	115	129	143	157	164
Iowa	96	99	104	112	128	134	145	160	213	197	162	156	143	136		113	98	80	58	63	67	73	73	74	74	74	75	80	87	101	107	121	134	150	154
Missouri	97	100	103	102	108	115	125	137	167	156	133	127	117	112		92	79	67	55	57	58	60	60	60	58	59	60	66	74	82	91	102	113	116	123
North Dakota	97	100	103	103	112	118	124	130	145	141	136	128	114	109		95	85	73	66	68	67	68	67	64	57	52	52	55	58	70	76	83	92	110	118
South Dakota	96	101	103	101	108	116	126	145	181	173	146	126	117	115		93	83	67	55	55	54	55	54	51	44	41	40	42	47	57	62	68	77	91	98
Nebraska	98	100	102	101	104	110	127	145	179	166	144	139	128	123		113	106	90	69	72	72	73	72	69	65	68	55	59	64	77	86	96	108	126	139
Kansas	101	99	99	103	109	115	122	132	151	149	130	127	118	115		113	103	89	70	72	73	75	78	78	76	71	71	74	84	96	111	120	140	163	169
West N. Central	97	100	103	105	114	122	134	147	184	174	150	142	132	126	. .	109	97	81	64	67	68	71	71	70	67	65	65	69	76	80	96	106	119	135	142
Delaware	100	101	99	100	105	115	124	129	139	129	119	119	107	112		111	107	95	80	80	82	84	87	89	89	89	93	96	108	111	123	137	160	163	163
Maryland	97	100	103	104	109	118	129	136	166	146	141	136	133	131		123	120	106	90	90	91	94	98	101	100	100	105	111	124	136	147	165	196	201	206
Virginia	97	100	103	97	117	125	142	167	189	180	157	170	162	154		134	117	99	88	91	97	103	110	111	110	112	115	118	131	146	171	200	224	226	246
West Virginia	97	100	103	101	104	112	122	135	154	141	125	127	125	120		105	98	81	74	78	78	82	82	84	85	85	89	90	99	105	106	121	137	149	155
North Carolina	97	99	104	102	114	130	152	176	223	196	166	195	192	187		158	135	114	86	101	111	121	132	138	138	138	136	150	161	193	224	268	310	324	341
South Carolina	101	98	101	94	98	107	122	162	230	186	126	128	136	138		104	90	73	57	67	76	78	83	87	88	89	95	103	112	136	162	172	196	208	224
Georgia	98	101	101	94	105	116	131	172	217	172	136	125	123	116		100	90	70	57	65	72	73	79	79	80	82	87	93	103	120	132	146	173	180	195
Florida	96	99	105	97	103	109	126	143	178	176	157	155	163	172		172	166	141	121	126	126	127	134	132	131	133	134	140	150	161	185	204	226	210	206
South Atlantic	98	100	103	98	108	119	135	161	198	174	146	152	151	148	. .	128	116	96	80	87	93	97	104	106	106	107	110	117	127	145	166	189	217	223	236
Kentucky	97	100	103	100	111	127	146	170	200	172	151	147	141	140		127	115	97	80	81	87	89	98	103	107	113	114	129	147	165	189	221	264	264	284
Tennessee	96	100	104	100	110	121	145	168	200	169	154	158	148	137		123	114	96	79	84	91	97	100	102	104	108	113	123	139	160	177	213	243	258	271
Alabama	98	98	103	98	98	103	128	143	177	147	135	143	144	154		143	129	102	88	99	110	114	116	123	122	122	125	129	139	160	180	208	247	252	275
Mississippi	97	102	102	97	111	121	131	155	218	150	148	143	134	136		122	112	92	73	82	90	92	97	106	106	106	111	122	133	145	165	196	216	238	251
East S. Central	97	100	103	99	109	120	140	162	199	163	149	149	142	141	. .	128	117	97	79	85	93	96	102	107	109	112	115	126	141	159	179	212	246	256	273
Arkansas	98	101	101	95	109	129	149	169	222	186	174	170	160	160		141	118	104	80	86	88	92	92	97	95	95	100	111	123	141	167	180	214	235	260
Louisiana	99	102	99	95	106	112	143	157	198	163	140	144	137	141		132	121	103	89	96	103	104	108	117	117	121	121	129	145	154	162	175	205	202	230
Oklahoma	98	101	101	95	104	114	130	140	166	160	139	133	125	131		127	116	94	76	83	86	91	91	94	93	93	96	101	111	120	131	156	169	185	211
Texas	95	100	105	103	103	115	133	141	174	156	133	128	137	146		138	122	96	83	88	91	94	96	99	97	99	98	105	109	124	137	150	165	187	187
West S. Central	96	100	104	100	103	116	134	143	177	159	136	132	136	144	. .	136	121	97	82	88	91	94	96	99	97	99	99	105	112	125	139	154	170	190	197
Montana	97	100	103	100	94	100	106	114	126	105	96	87	81	75		72	70	58	48	48	50	53	54	53	54	55	57	62	69	80	89	102	117	129	130
Idaho	100	101	99	96	99	114	130	146	172	162	136	133	129	123		116	114	96	76	77	80	83	86	85	85	86	87	94	106	124	140	153	160	168	165
Wyoming	97	103	100	103	94	97	121	147	176	146	134	121	112	100		98	95	77	62	62	62	65	66	66	66	68	71	78	88	102	115	132	147	168	169
Colorado	98	103	98	93	102	107	110	118	141	132	123	113	98	92		83	81	65	54	54	53	57	60	60	61	61	63	69	78	93	108	125	141	157	156
New Mexico	100	104	96	100	96	111	118	127	144	125	115	110	110	108		110	109	89	75	76	76	80	82	83	83	84	87	95	101	117	132	151	168	181	193
Arizona	95	100	105	97	95	105	125	140	165	148	135	124	128	121		123	123	104	90	90	91	94	96	95	94	95	96	102	110	127	145	158	176	181	180
Utah	100	102	98	98	104	117	122	144	167	137	133	133	131	130		126	122	98	83	84	84	87	90	89	89	89	89	93	100	112	121	127	136	146	146
Nevada	96	100	103	102	99	96	103	117	135	123	119	112	108	102		99	97	78	65	65	65	68	69	69	69	70	71	73	78	87	92	100	104	114	114
Mountain	98	102	100	98	98	106	117	130	151	133	122	115	110	105	. .	102	100	82	69	69	70	73	75	75	75	76	78	84	92	107	120	134	149	161	163
Washington	98	100	103	100	102	112	118	122	140	132	124	117	115	113		110	108	91	74	73	76	80	84	84	83	84	84	91	101	120	133	153	170	174	168
Oregon	97	100	103	99	100	104	112	118	130	130	122	115	113	110		107	106	88	72	72	74	77	82	82	82	84	85	91	99	117	130	143	152	156	152
California	93	99	108	111	116	130	136	142	167	168	166	165	164	164		160	158	133	109	110	115	119	124	123	121	121	122	128	141	168	193	219	244	234	215
Pacific	94	99	106	107	111	122	129	134	156	155	151	148	147	146	. .	142	140	118	96	97	101	105	110	109	107	108	109	115	126	150	171	194	215	210	196
United States	97	100	103	103	108	117	129	140	170	157	139	135	130	127		115	106	89	73	76	79	82	85	85	84	84	85	91	99	114	126	142	159	170	175

FARM REAL ESTATE PRICES

PERCENTAGE CHANGE FROM MARCH 1, 1920
TO MARCH 1, 1949



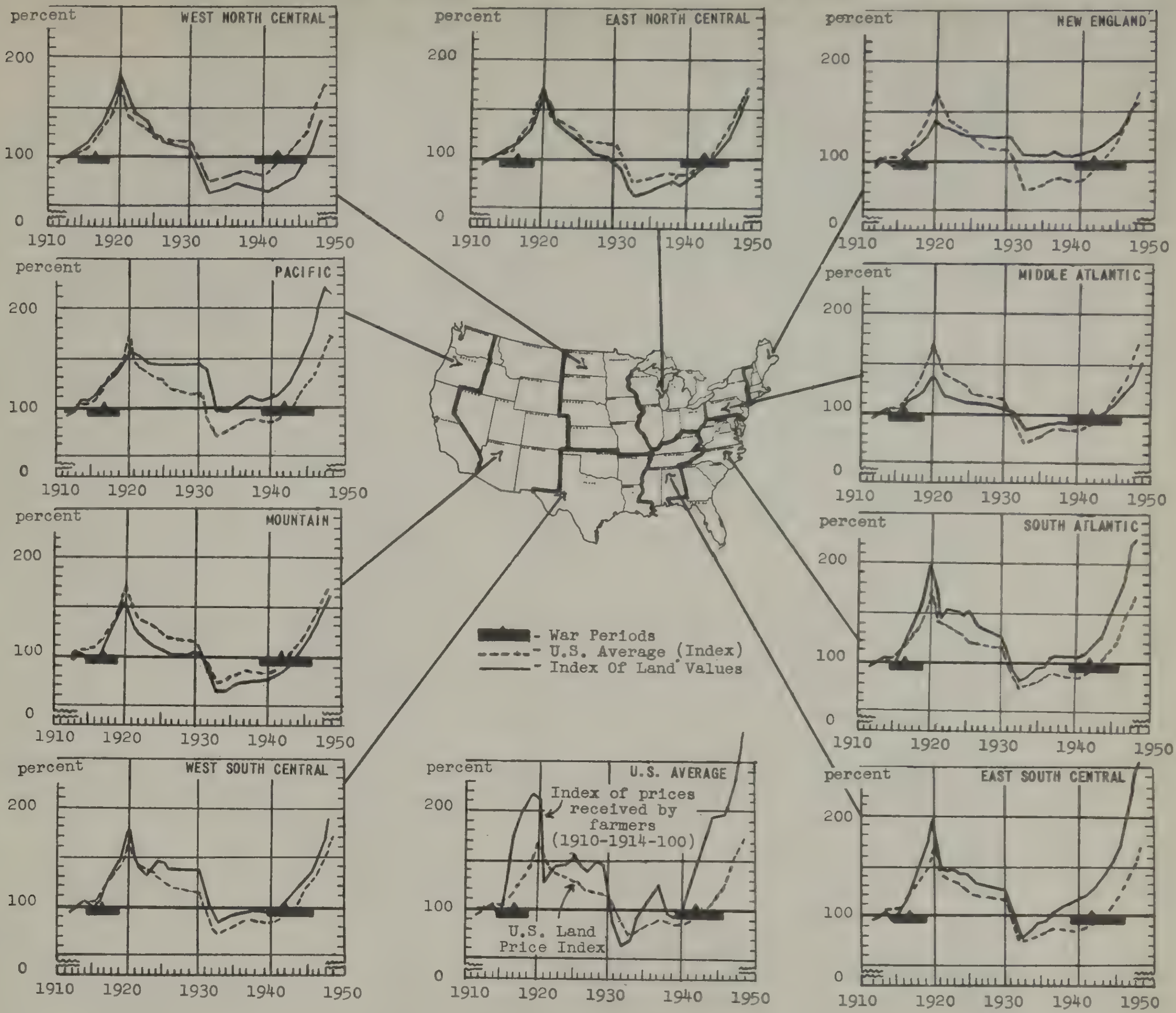
PERCENTAGE CHANGE FROM 1935-1939 AVERAGE
TO MARCH 1, 1949



Based on Data of USDA

FARM LAND PRICES--REACH 1920 PEAK

INDEX OF LAND VALUES, 1912 - 1914 = 100 (Values as of March 1)



Farm land prices have reached the peak set in 1920, but are now rising at a declining rate. For 72 long months, farm land prices increased an average of 1 per cent per month, but last year the total climb was only 7 per cent. Land prices are now 105 per cent above (more than double) the 1935-39 average. By comparison, the 1920 peak was only 70 per cent above the 1912-14 average.

All states reported an increase in land prices during 1947 except Florida, California, Louisiana and Kentucky. Low prices for citrus and other fruits are largely responsible for the 7 per cent drop in Florida and the 4 per cent drop in California. Prices dropped less than 2 per cent in Louisiana and held steady in Kentucky. Western Kansas, Northern Oklahoma and Texas reported the sharpest increase of the year with prices up about 18 per cent. Prices in 32 states are now above the 1920 peak.

Reports from our field staff since March indicate that there has been a very noticeable reduction in the number of farms sold since the break in farm commodity prices last February. Such a decline is usually one of the most dependable signs of an impending break in prices. Actually, this decline began showing up months ago. The total number of voluntary farm transfers recorded in 1947 was only 49 per 1,000 farms. This was the smallest number in 5 years. In 1946, transfers hit an all-time peak of 57.7 transfers per 1,000 farms. The peak of World War 1 was 48.8 transfers in 1919.

Based on Data of U.S.D.A.

Cash buyers bought 55 per cent of the farms sold last year. This is the fifth consecutive year in which more than half of the farms sold went for cash. On the farms which were mortgaged the average down payment last year was 42 per cent. This means that many farms are carrying a loan substantially above the sale value of that land in 1940.

On an average, any mortgage which represents one-half or more of the present purchase price is equal to or greater than the entire sale value just 7 years ago. Actually, nearly 3 out of 4 (to be exact, 74 per cent) of all farms mortgaged last year carried a mortgage equal to or above 50 per cent of the sale price. Over one-third carried a mortgage of 75 per cent or more.

Individuals and commercial banks are supplying the bulk of the inflationary credit. The proportion of total loans advanced by individuals on property sold last year was 46 per cent and the proportion advanced by commercial banks was 26 per cent. Life Insurance companies advanced 11 per cent, Federal Agencies 6 per cent, and all others 11 per cent.

These graphs and data represent price trends more than value trends. True values fluctuate less than price and tend to anticipate price changes. During a period of land price inflation, "cheap" farms usually sell high in proportion to their true value. They are also among the first to feel the effect of price declines.

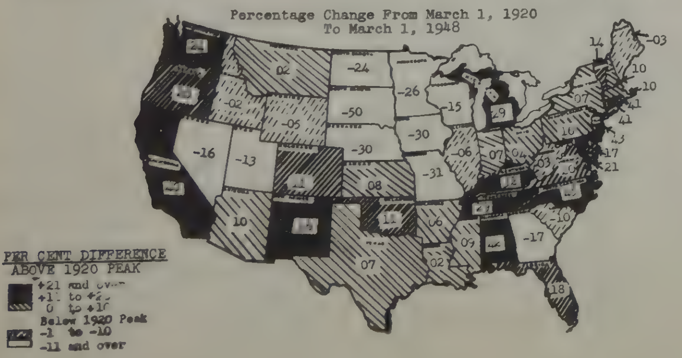
(Printed in U.S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

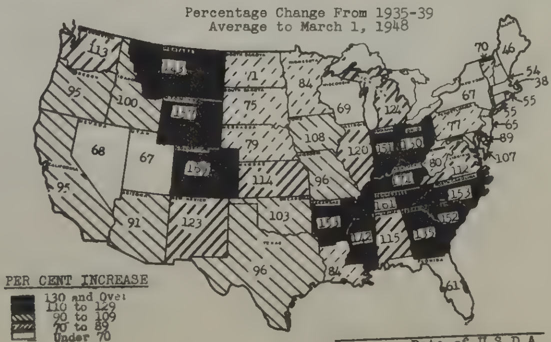
PRICE TRENDS OF FARM REAL ESTATE
INDEX NUMBERS OF ESTIMATED PRICE PER ACRE, BY GEOGRAPHIC DIVISONS

1912-1914 = 100 per cent

State and Geographic Division	1912	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	. .	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43	'44	'45	'46	'47	'48
Maine	100	102	98	96	98	110	115	124	142	132	127	129	127	124		124	123	111	94	94	94	95	97	96	94	95	95	97	99	112	119	125	134	138
New Hampshire	97	101	102	101	98	103	111	116	129	123	126	111	109	111		111	110	102	92	91	90	92	94	93	93	94	95	97	100	107	117	122	136	142
Vermont	101	101	98	104	115	127	133	136	150	150	145	134	130	125		123	121	112	101	100	101	101	102	100	100	101	101	102	110	119	129	144	166	171
Massachusetts	98	100	102	98	100	110	114	119	140	134	134	132	131	132		131	130	120	112	112	111	111	112	113	113	113	113	114	115	125	133	141	145	154
Rhode Island	100	101	100	102	106	112	118	123	130	130	127	124	126	128		134	126	118	118	118	118	119	120	119	118	120	121	126	127	139	144	159	174	183
Connecticut	98	100	102	100	102	110	116	121	137	134	140	137	140	137		140	140	133	124	123	123	125	126	124	124	124	128	133	134	144	150	166	186	193
New England	99	101	100	99	102	112	117	123	140	135	134	130	128	127	. .	127	126	116	105	104	104	105	107	106	105	106	107	109	112	122	130	140	152	159
New York	98	100	102	100	103	109	115	118	133	123	116	115	112	111		103	96	92	82	82	84	85	86	87	86	86	86	87	97	101	109	120	138	142
New Jersey	98	100	102	100	102	111	115	119	130	130	121	115	120	124		125	123	118	110	111	111	113	115	116	116	116	121	128	136	141	151	164	185	186
Pennsylvania	98	100	102	100	105	114	119	124	140	131	120	118	116	114		107	101	96	78	79	82	86	87	89	88	90	90	95	104	111	123	130	143	154
Middle Atlantic	98	100	102	100	104	112	117	121	136	127	118	116	114	114	. .	106	101	96	82	83	85	88	89	90	89	90	91	94	103	109	119	128	144	151
Ohio	98	100	102	107	113	119	131	135	159	134	124	122	118	110		90	82	70	59	63	66	71	75	74	76	77	80	89	97	111	121	140	158	166
Indiana	97	100	103	102	110	116	128	135	161	148	120	116	108	102		80	72	60	53	56	61	66	70	73	73	74	77	88	98	112	124	145	158	172
Illinois	97	100	103	102	105	111	119	130	160	153	126	123	116	115		91	80	66	54	59	61	65	70	73	72	75	76	86	91	105	112	124	141	150
Michigan	98	99	103	105	111	120	134	137	154	152	148	145	138	133		121	115	97	80	82	83	84	91	92	92	91	93	105	115	134	145	167	194	198
Wisconsin	97	100	103	104	117	124	133	143	171	168	154	147	139	130		117	104	91	80	80	82	84	89	88	86	84	82	88	92	102	110	120	135	145
East N. Central	97	100	103	104	110	116	127	135	161	151	132	128	121	116	. .	96	87	73	62	65	68	72	76	78	77	78	80	89	96	110	119	134	152	161
Minnesota	95	100	105	107	122	138	155	167	213	212	187	177	170	159		133	116	98	79	83	83	85	87	88	86	86	86	90	100	110	115	129	143	157
Iowa	96	99	104	112	128	134	145	160	213	197	162	156	143	136		113	98	80	58	63	67	73	73	74	74	74	75	80	87	101	107	121	134	150
Missouri	97	100	103	102	108	115	125	137	167	156	133	127	117	112		92	79	67	55	57	58	60	60	60	58	59	60	66	74	82	91	102	113	116
North Dakota	97	100	103	103	112	118	124	130	145	141	136	128	114	109		95	85	73	66	68	67	68	67	64	57	52	52	55	58	70	76	83	92	110
South Dakota	96	101	103	101	108	116	126	145	181	173	146	126	117	115		93	83	67	55	55	54	55	54	51	44	41	40	42	47	57	62	68	77	91
Nebraska	98	100	102	101	104	110	127	145	179	166	144	139	128	123		113	106	90	69	72	72	73	72	69	65	68	55	59	64	77	86	96	108	126
Kansas	101	99	99	103	109	115	122	132	151	149	130	127	118	115		113	103	89	70	72	73	75	78	78	76	71	71	74	84	96	111	120	140	163
West N. Central	97	100	103	105	114	122	134	147	184	174	150	142	132	126	. .	109	97	81	64	67	68	71	71	70	67	65	65	69	76	80	96	106	119	135
Delaware	100	101	99	100	105	115	124	129	139	129	119	119	107	112		111	107	95	80	80	82	84	87	89	89	89	93	96	108	111	123	137	160	163
Maryland	97	100	103	104	109	118	129	136	166	146	141	136	133	131		123	120	106	90	90	91	94	98	101	100	100	105	111	124	136	147	165	196	201
Virginia	97	100	103	97	117	125	142	167	189	180	157	170	162	154		134	117	99	88	91	97	103	110	111	110	112	115	118	131	146	171	200	224	226
West Virginia	97	100	103	101	104	112	122	135	154	141	125	127	125	120		105	98	81	74	78	78	82	82	84	85	85	89	90	99	105	106	121	137	149
North Carolina	97	99	104	102	114	130	152	176	223	196	166	195	192	187		158	135	114	86	101	111	121	132	138	138	138	136	150	161	193	224	268	310	324
South Carolina	101	98	101	94	98	107	122	162	230	186	126	128	136	138		104	90	73	57	67	76	78	83	87	88	89	95	103	112	136	162	172	196	208
Georgia	98	101	101	94	105	116	131	172	217	172	136	125	123	116		100	90	70	57	65	72	73	79	79	80	82	87	93	103	120	132	146	173	180
Florida	96	99	105	97	103	109	126	143	178	176	157	155	163	172		172	166	141	121	126	126	127	134	132	131	133	134	140	150	161	185	204	226	210
South Atlantic	98	100	103	98	108	119	135	161	198	174	146	152	151	148	. .	128	116	96	80	87	93	97	104	106	106	107	110	117	127	145	166	189	217	223
Kentucky	97	100	103	100	111	127	146	170	200	172	151	147	141	140		127	115	97	80	81	87	89	98	103	107	113	114	129	147	165	189	221	264	264
Tennessee	96	100	104	100	110	121	145	168	200	169	154	158	148	137		123	114	96	79	84	91	97	100	102	104	108	113	123	139	160	177	213	243	258
Alabama	98	98	103	98	98	103	128	143	177	147	135	143	144	154		143	129	102	88	99	110	114	116	123	122	122	125	129	139	160	180	208	247	252
Mississippi	97	102	102	97	111	121	131	155	218	150	148	143	134	136		122	112	92	73	82	90	92	97	106	106	106	111	122	133	145	165	196	216	238
East S. Central	97	100	103	99	109	120	140	162	199	163	149	149	142	141	. .	128	117	97	79	85	93	96	102	107	109	112	115	126	141	159	179	212	246	256
Arkansas	98	101	101	95	109	129	149	169	222	186	174	170	160	160		141	118	104	80	86	88	92	92	97	95	95	100	111	123	141	167	180	214	235
Louisiana	99	102	99	95	106	112	143	157	198	163	140	144	137	141		132	121	103	89	96	103	104	108	117	117	121	121	129	145	154	162	175	205	202
Oklahoma	98	101	101	95	104	114	130	140	166	160	139	133	125	131		127	116	94	76	83	86	91	91	94	93	93	96	101	111	120	131	156	169	185
Texas	95	100	105	103	103	115	133	141	174	156	133	128	137	146		138	122	96	83	88	91	94	96	99	97	99	98	105	109	124	137	150	165	187
West S. Central	96	100	104	100	103	116	134	143	177	159	136	132	136	144	. .	136	121	97	82	88	91	94	96	99	97	99	99	105	112	125	139	154	170	190
Montana	97	100	103	100	94	100	106	114	126	105	96	87	81	75		72	70	58	48	48	50	53	54	53	54	55	57	62	69	80	89	102	117	129
Idaho	100	101	99	96	99	114	130	146	172	162	136	133	129	123		116	114	96	76	77	80	83	86	85	85	86	87	94	106	124	140	153	160	168
Wyoming	97	103	100	103	94	97	121	147	176	146	134	121	112	100		98	95	77	62	62	62	65	66	66	66	68	71	78	88	102	115	132	147	168
Colorado	98	103	98	93	102	107	110	118	141	132	123	113	98	92		83	81	65	54	54	53	57	60	60	61	61	63	69	78	93	108	125	141	157
New Mexico	100	104	96	100	96	111	118	127	144	125	115	110	110	108		110	109	89	75	76	76	80	82	83	83	84	87	95	101	117	132	151	168	181
Arizona	95	100	105	97	95	105	125	140	165	148	135	124	128	121		123	123	104	90	90	91	94	96	95	94	95	96	102	110	127	145	158	176	181
Utah	100	102	98	98	104	117	122	144	167	137	133	133	131	130		126	122	98	83	84	84	87	90	89	89	89	89	93	100	112	121	127	136	146
Nevada	96	100	103	102	99	96	103	117	135	123	119	112	108	102		99	97	78	65	65	65	68	69	69	69	70	71	73	78	87	92	100	104	114
Mountain	98	102	100	98	98	106	117	130	151	133	122	115	110	105	. .	102	100	82	69	69	70	73	75	75	75	76	78	84	92	107	120	134	149	161
Washington	98	100	103	100	102	112	118	122	140	132	124	117	115	113		110	108	91	74	73	76	80	84	84	83	84	84	91	101	120	133	153	170	174
Oregon	97	100	103	99	100	104	112	118	130	130	122	115	113	110		107	106	88	72	72	74	77	82	82	82	84	85	91	99	117	130	143	152	156
California	93	99	108	111	116	130	136	142	167	168	166	165	164	164		160	158	133	109	110	115	119	124	123	121	121	122	128	141	168	193	219	244	234
Pacific	94	99	106	107	111	122	129	134	156	155	151	148	147	146	. .	142	140	118	96	97	101	105	110	109	107	108	109	115	126	150	171	194	215	210
United States	97	100	103	103	108	117	129	140	170	157	139	135	130	127		115	106	89	73	76	79	82	85	85	84	84	85	91	99	114	126	142	159	170

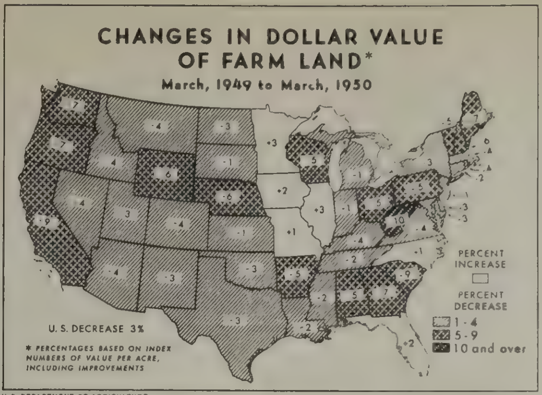
FARM REAL ESTATE PRICES


Percentage Change From March 1, 1920
To March 1, 1948


Percentage Change From 1935-39
Average to March 1, 1948

Based on Data of U.S.D.A.

FARM LAND PRICE TRENDS



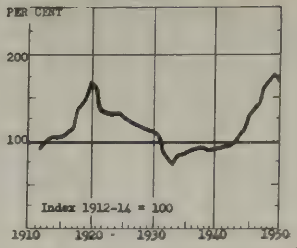
CHANGES IN DOLLAR VALUE OF FARM LAND*

March, 1949 to March, 1950

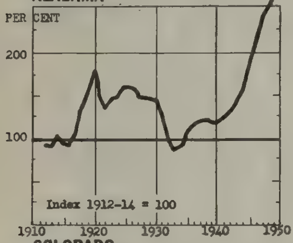
PERCENT INCREASE
PERCENT DECREASE
1 - 4
5 - 9
10 and over
U. S. DECREASE 3%
* PERCENTAGES BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS

U S DEPARTMENT OF AGRICULTURE — BUREAU OF AGRICULTURAL ECONOMICS

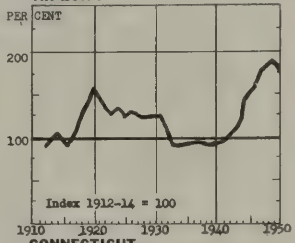
U. S. AVERAGE



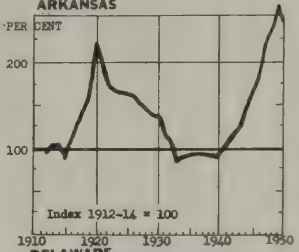
ALABAMA



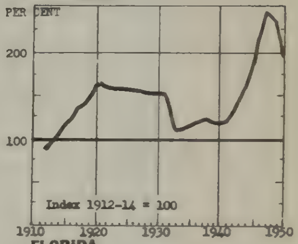
ARIZONA



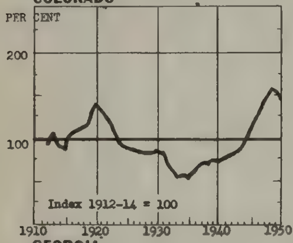
ARKANSAS



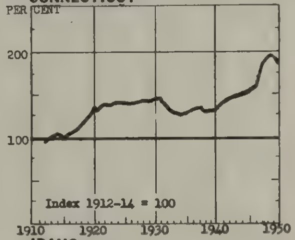
CALIFORNIA



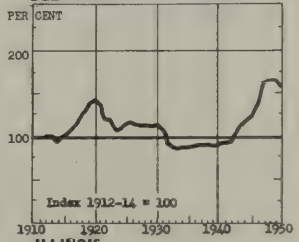
COLORADO



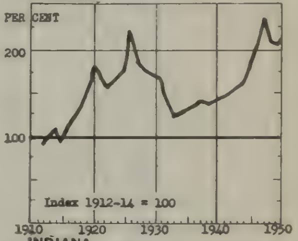
CONNECTICUT



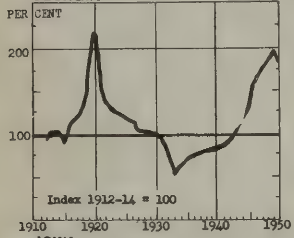
DELAWARE



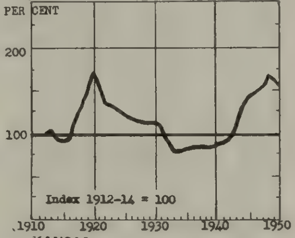
FLORIDA



GEORGIA



IDAHO



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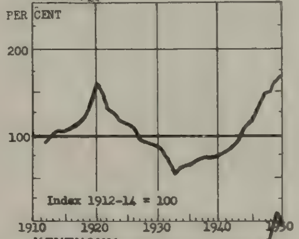

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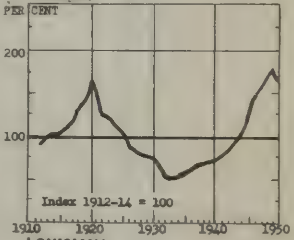

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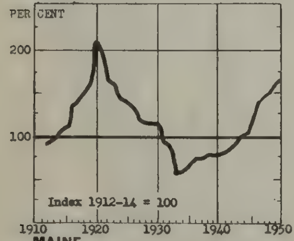

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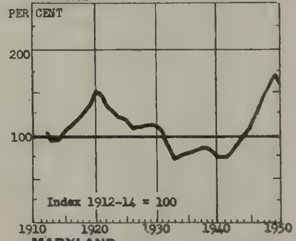

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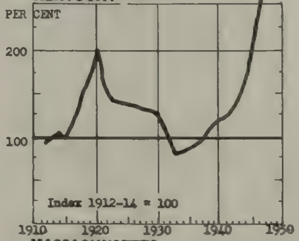

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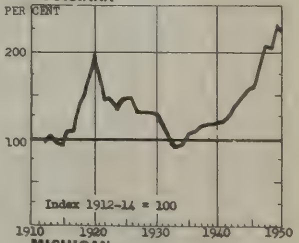

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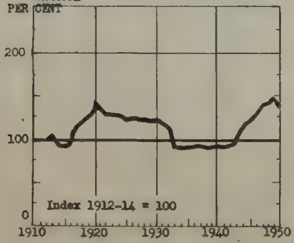

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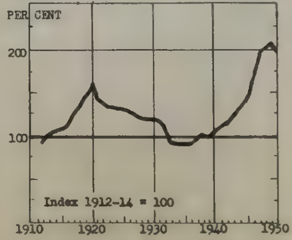

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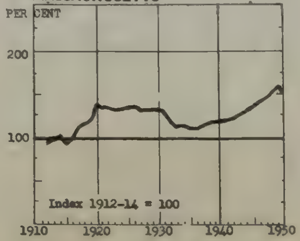

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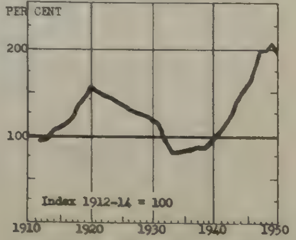
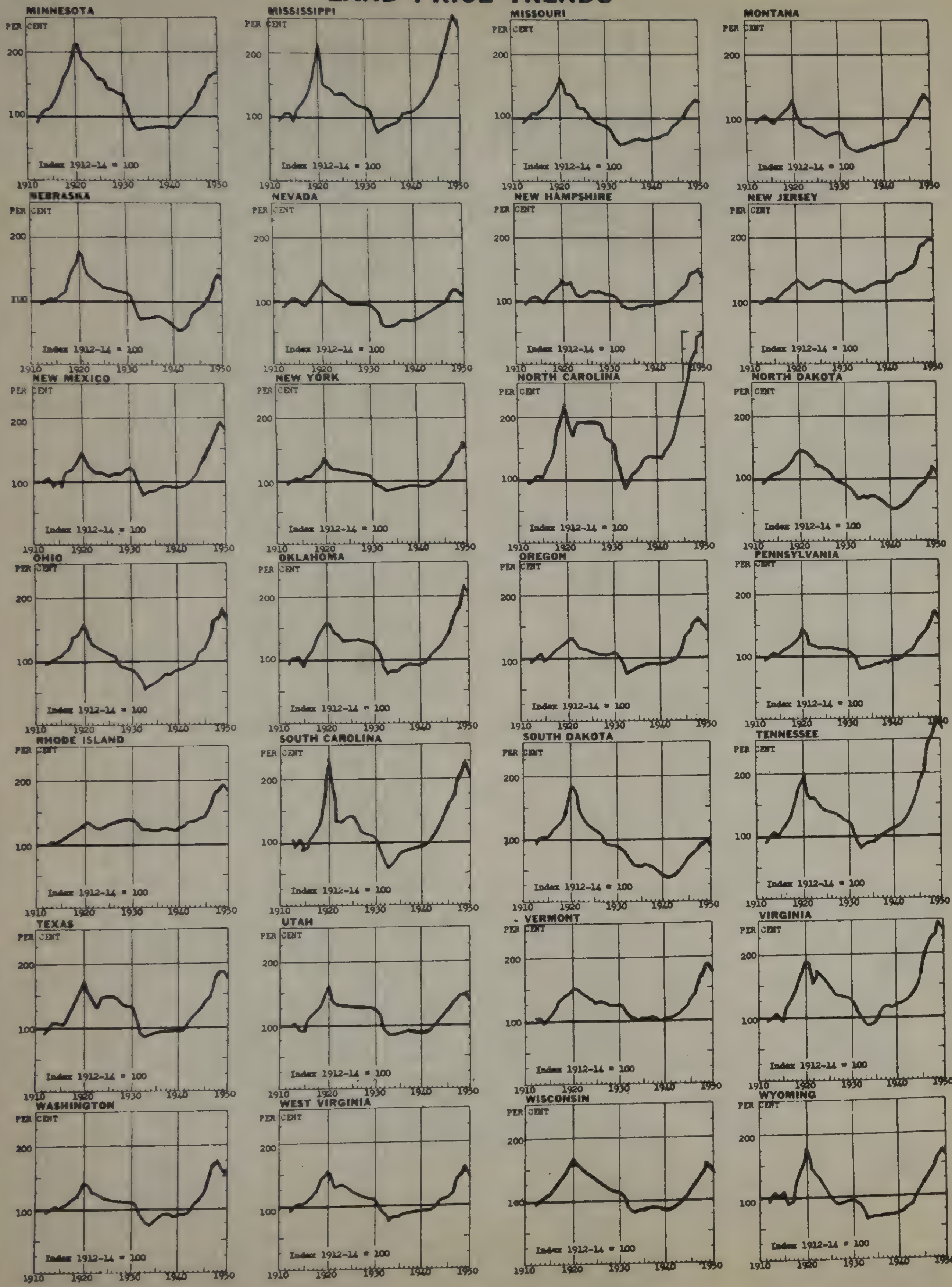


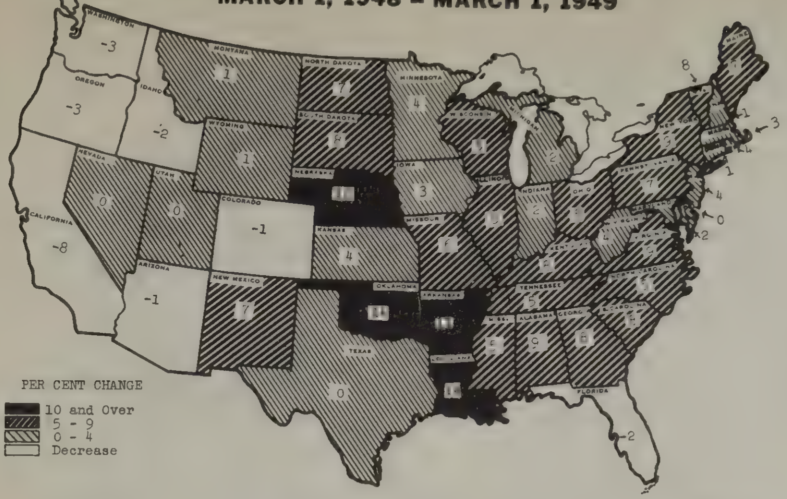
DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

LAND PRICE TRENDS



FARM LAND PRICE TRENDS

MARCH 1, 1948 – MARCH 1, 1949



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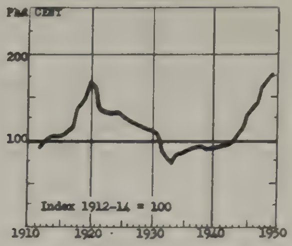

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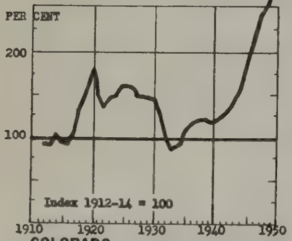

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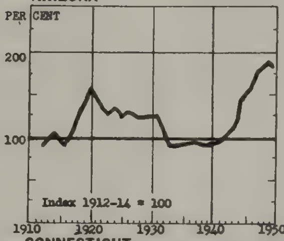

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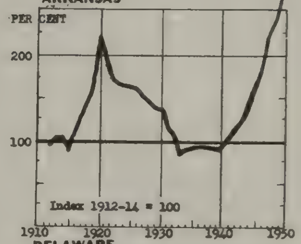

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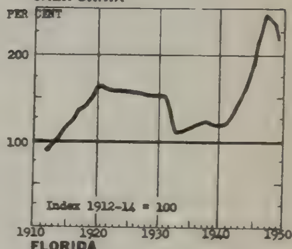

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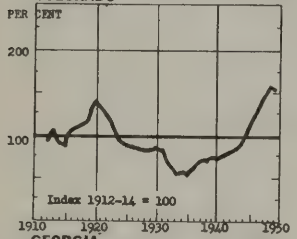

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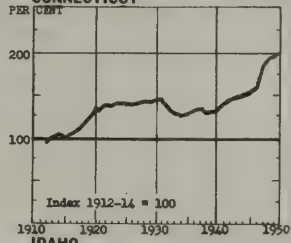

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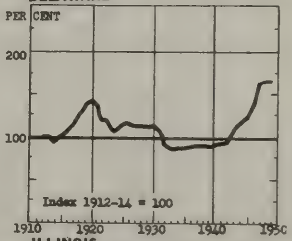

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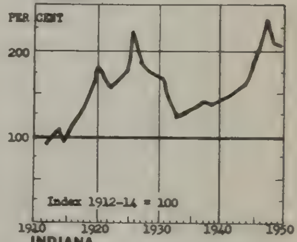

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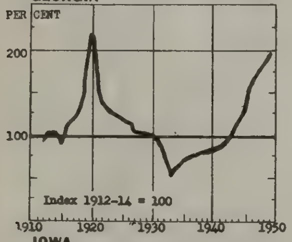

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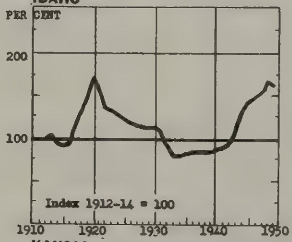

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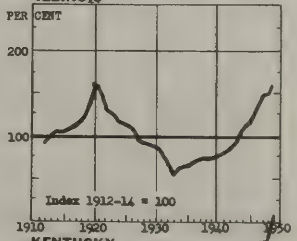

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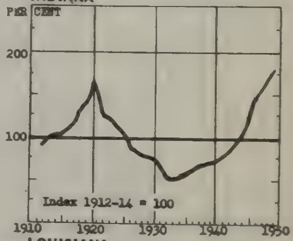

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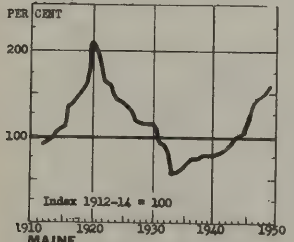

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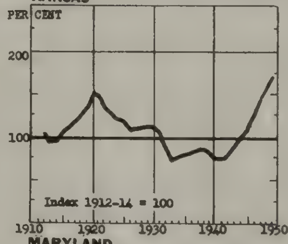

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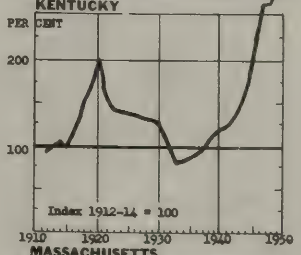

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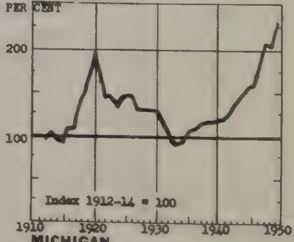

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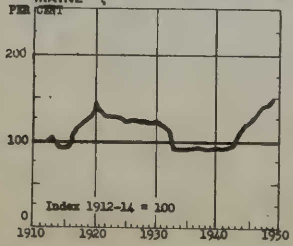

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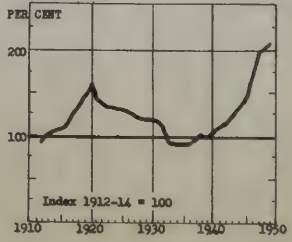

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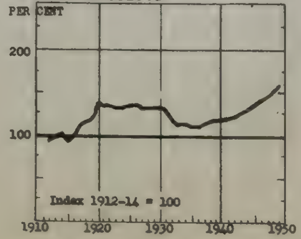

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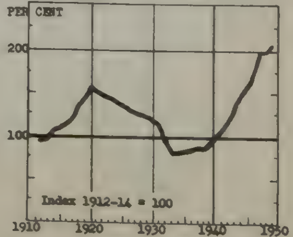

LAND PRICE TRENDS

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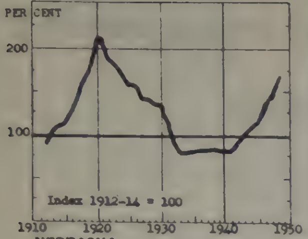

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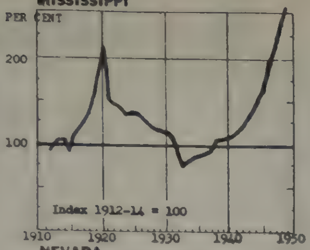

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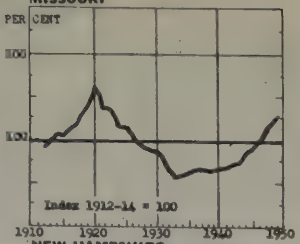

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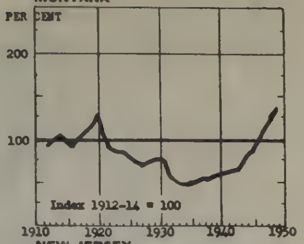

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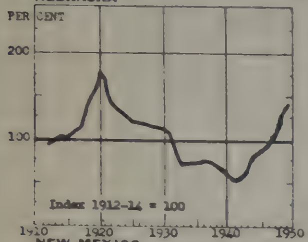

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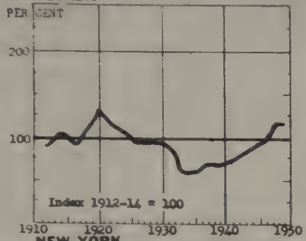

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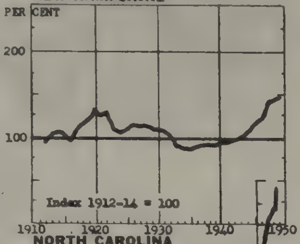

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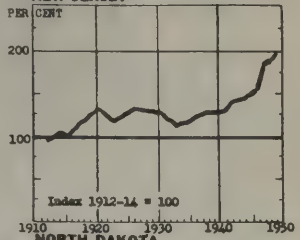

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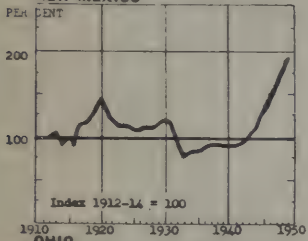

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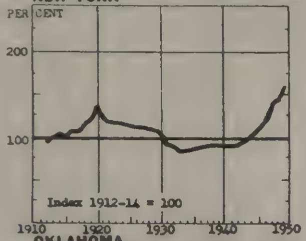

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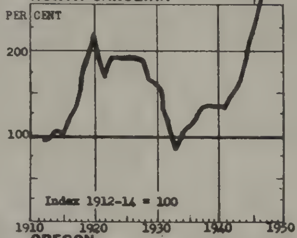

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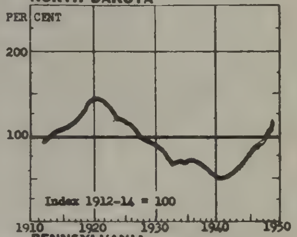

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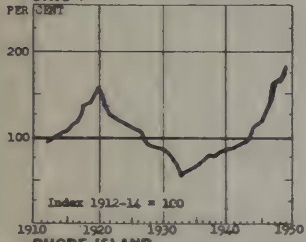

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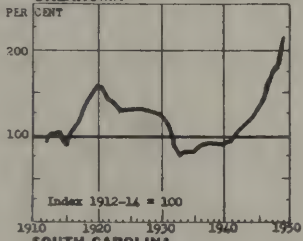

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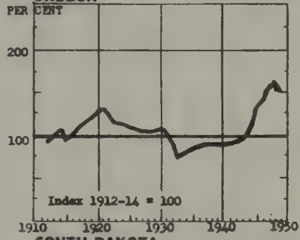

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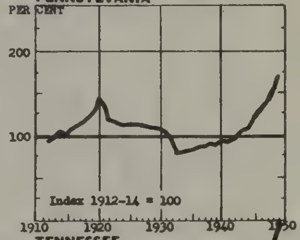

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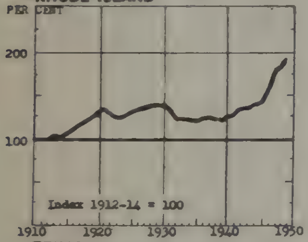

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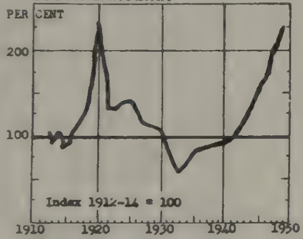
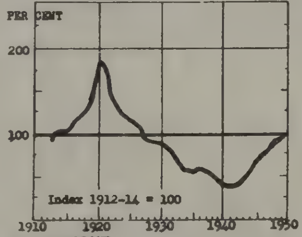


SOUTH DAKOTA



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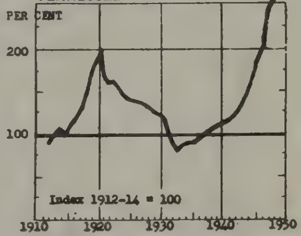

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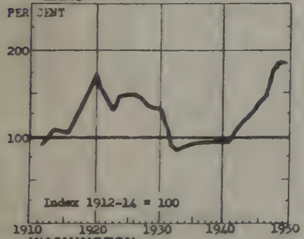

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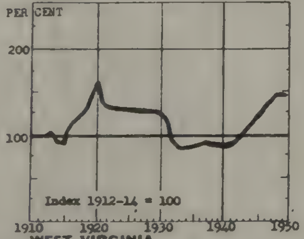

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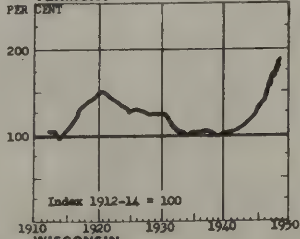
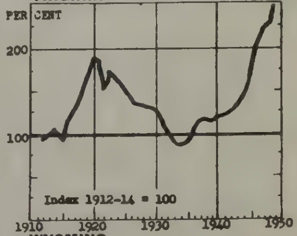
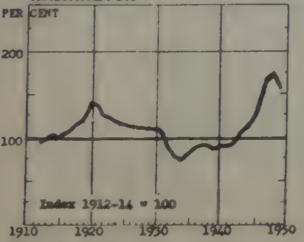


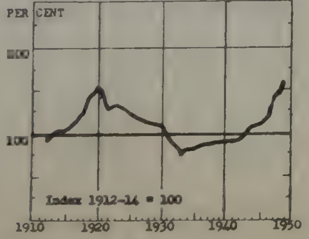
VIRGINIA



WASHINGTON



WEST VIRGINIA



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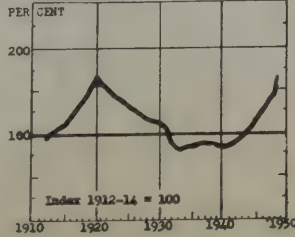

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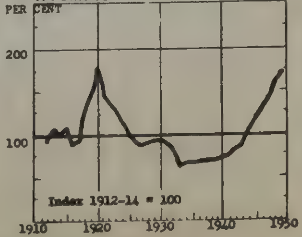
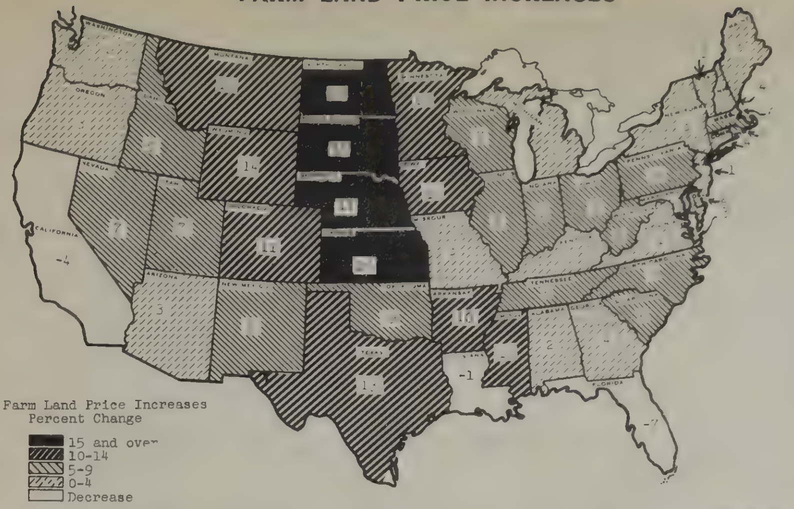
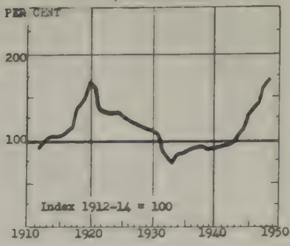


PRICE TRENDS

FARM LAND PRICE INCREASES



U. S. AVERAGE



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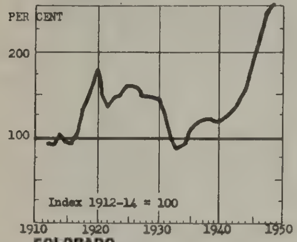

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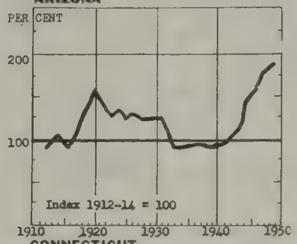

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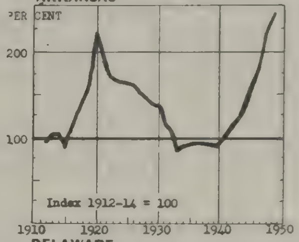

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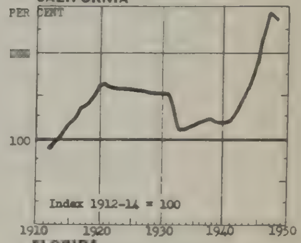

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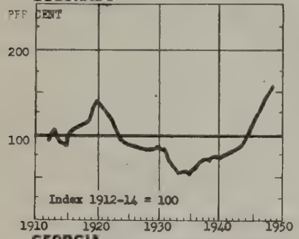

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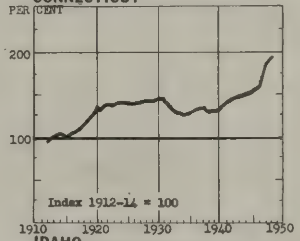

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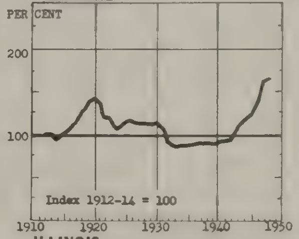
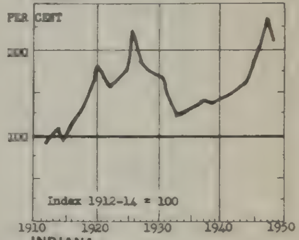
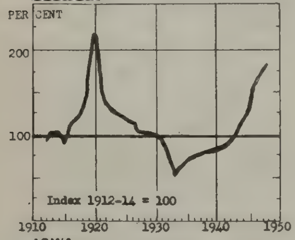


FLORIDA



GEORGIA



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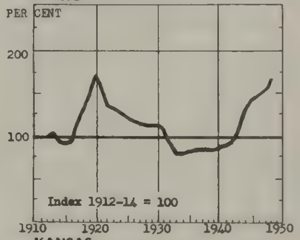

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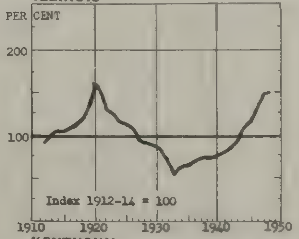

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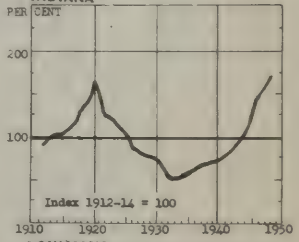

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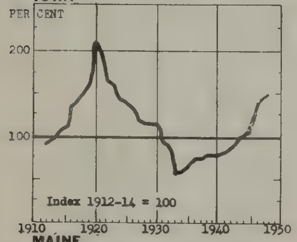

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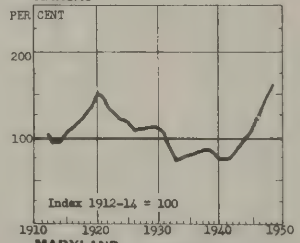

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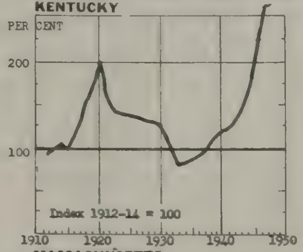

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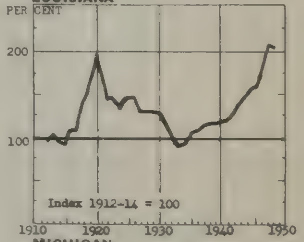

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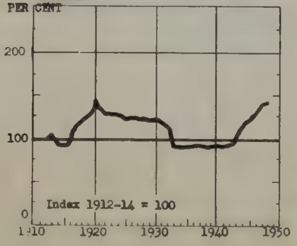

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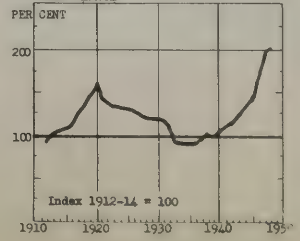

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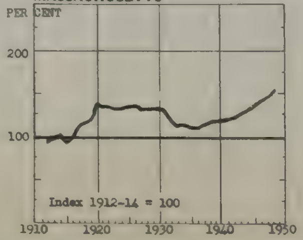

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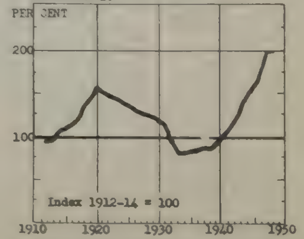

LAND PRICE TRENDS

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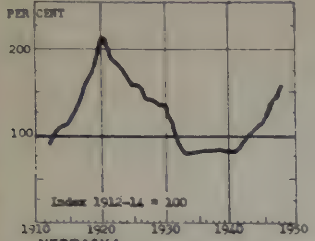

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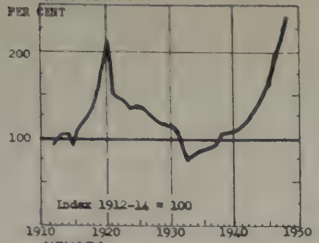

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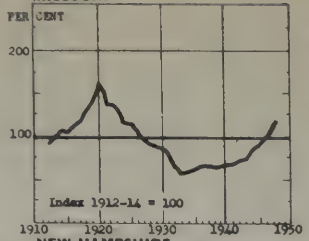

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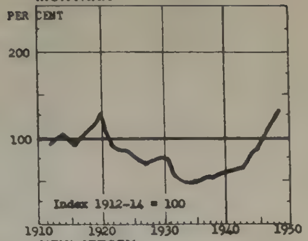

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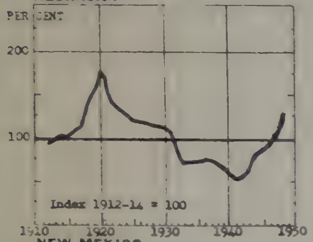

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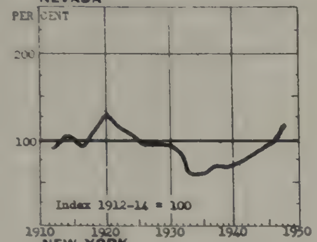

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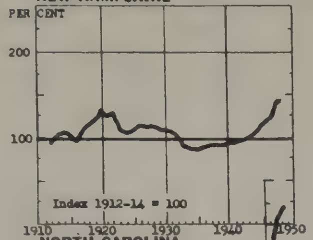

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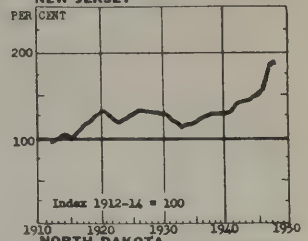

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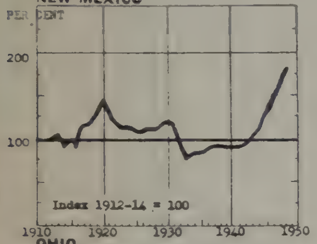

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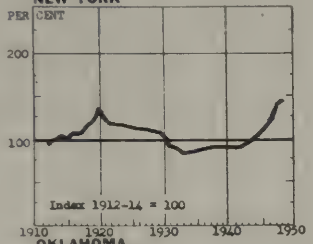

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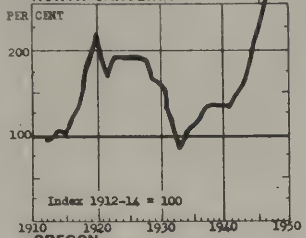

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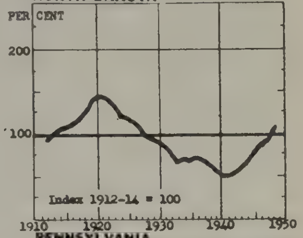

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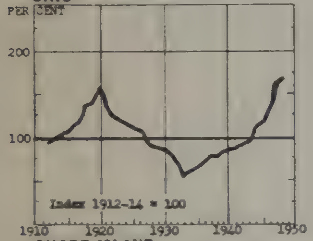

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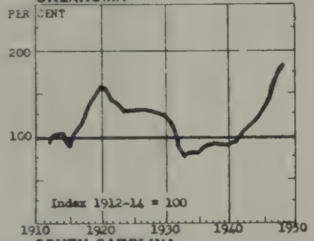

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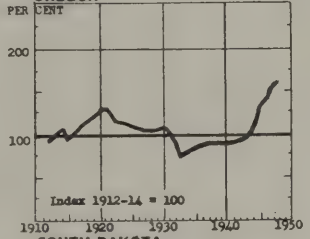

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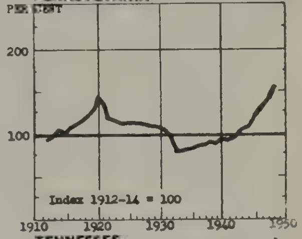

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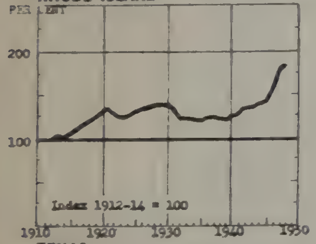

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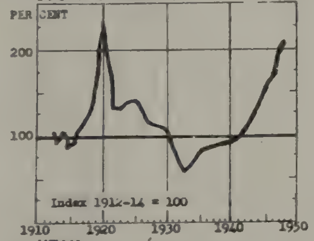
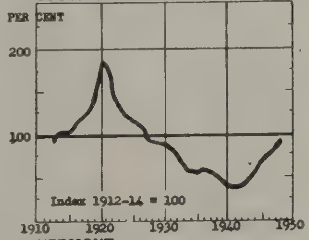


SOUTH DAKOTA



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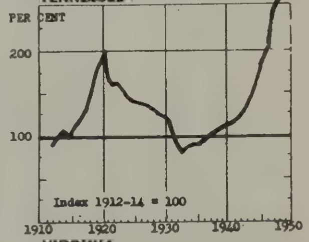

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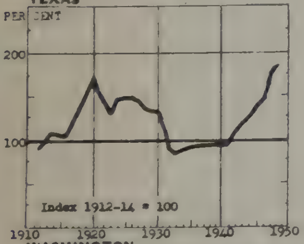

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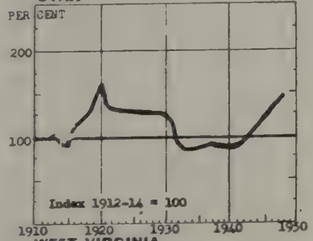

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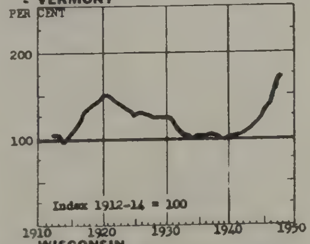

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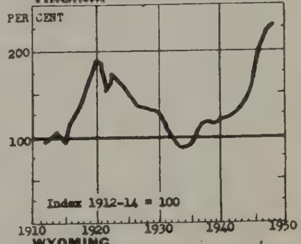

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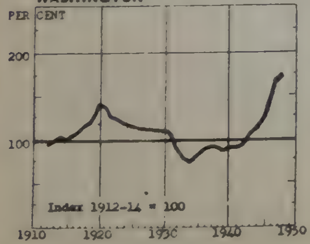

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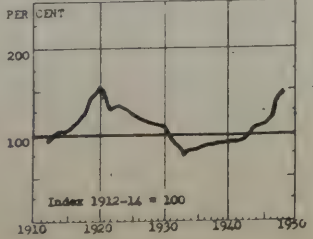

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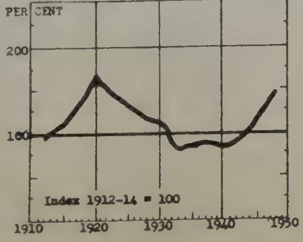

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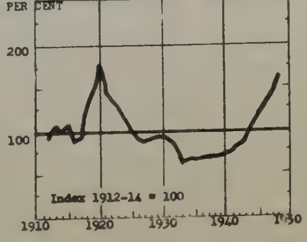
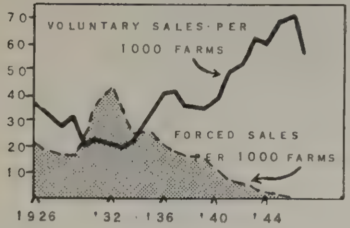


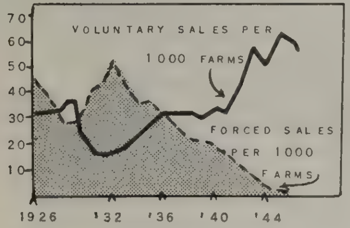
LAND VALUES FOLLOW SALES

THE RECORD FOR 35 YEARS

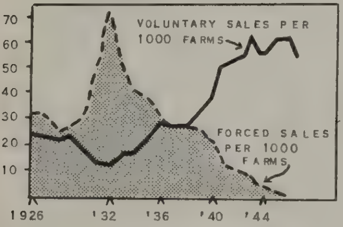
PACIFIC



MOUNTAIN



WEST N. CENTRAL



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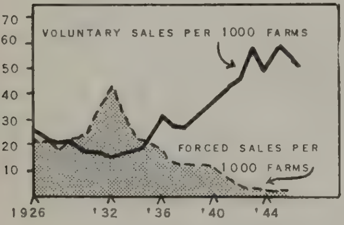
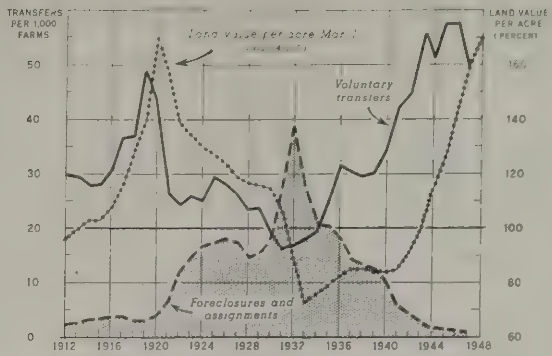
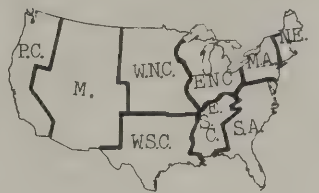


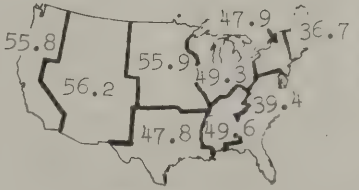




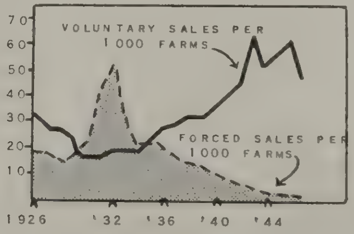
Geographic Divisions of U.S.

Number of Voluntary Sales per 1,000 farms by Divisions.

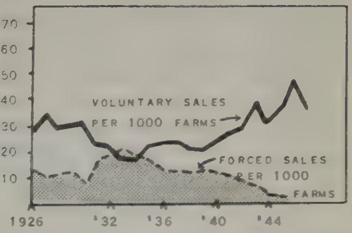
Year Ending March 1, 1948



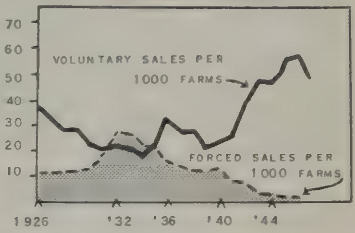
WEST S. CENTRAL



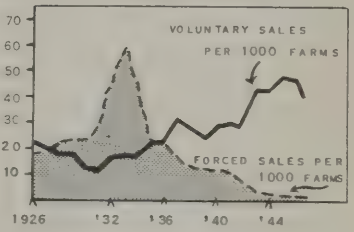
NEW ENGLAND



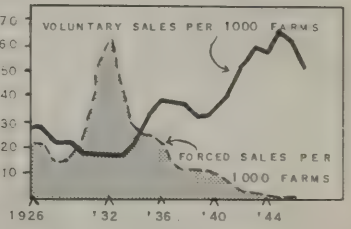
MIDDLE ATLANTIC



SOUTH ATLANTIC



EAST S. CENTRAL



The number of farm sales is a good guide to the trend of farm land values. Through 35 years for which accurate data are available, the course of land values has closely paralleled that of voluntary sales.

Following World War 1, the total volume of farm sales broke one year before prices began to come down. It is, therefore, significant that last year was the first time since the close of the war that the volume of farm sales declined.

A record high of 57.7 voluntary sales per 1000 farms was reached for the U. S. in 1947. There has been, however, a general decrease in the year ending March 1948, ranging from 10 per cent in the West North Central and Mountain states to over 20 per cent in New England, South Central and Pacific coast states. For the country as a whole the decline was 15 per cent.

Farm sales are mostly well financed. Over 50 per cent of those recorded in 1947 were entirely for cash.

On mortgage financed sales, down payments averaged 2/5 of the purchase price. But at current prices farms carrying a debt of 50 per cent or more of the purchase price are actually mortgaged more than the total value prior to 1940.

Active farmers were the buyers in 64 per cent of the sales made in 1946-47; just less than 1/2 of these were formerly tenants. Five out of six farm sales were made by individuals; sales by estates and corporations have decreased steadily.

Involuntary transfers of farm real estate, through mortgage foreclosures, bankruptcy, etc. have fallen to a record low. For the year ending March 1, 1947, the average number of such sales was only 1.8 per thousand farms.

VOLUNTARY AND FORCED SALES OF FARMS

VOLUNTARY FARM SALES AND TRADES - Including contracts to purchase (but no options).
Number of farms changing ownership per 1000 of all farms for the 12 months ending March 15 each year.

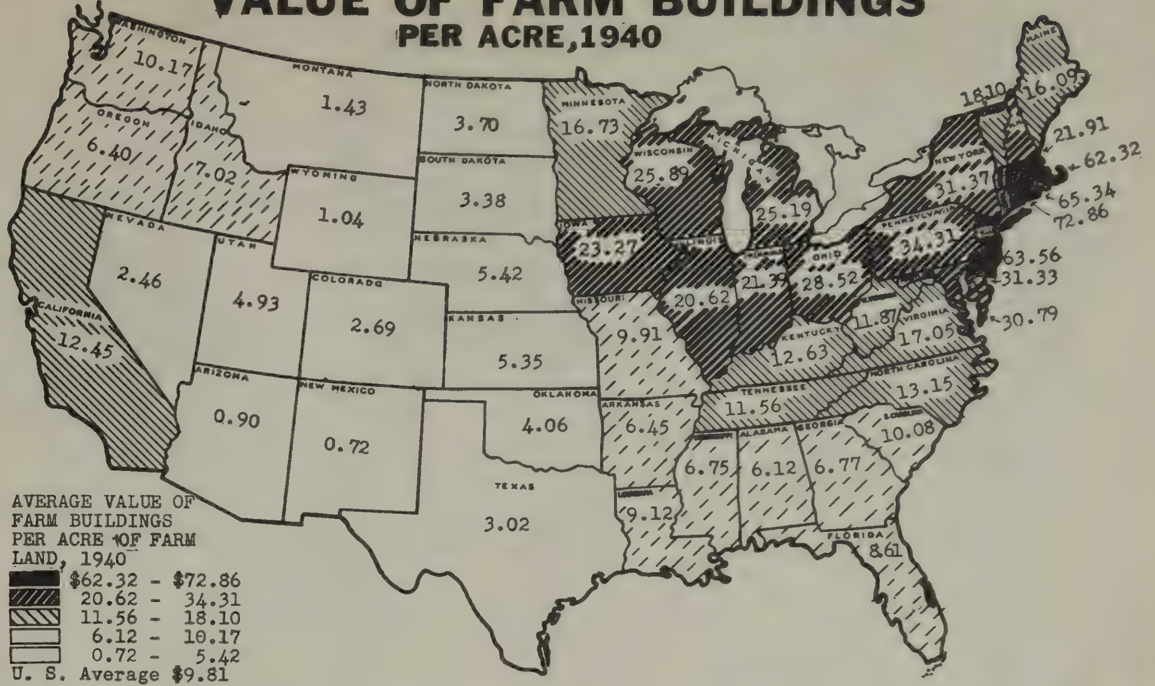
State and Geographic Division	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
Maine	31.7	32.8	33.2	29.1	29.7	31.0	21.0	21.2	22.4	22.2	25.5	28.6	29.5	25.3	24.4	28.6	28.0	41.5	53.9	43.3	45.7	58.6	46.4
New Hampshire	34.4	33.5	37.8	29.7	31.8	37.0	30.4	27.5	26.0	25.1	25.5	24.0	23.4	23.0	22.6	23.2	24.5	25.1	32.0	33.3	39.0	56.0	40.1
Vermont	46.0	42.6	40.6	33.7	37.55	34.0	32.2	27.4	20.3	21.3	24.3	26.7	25.7	24.9	23.8	28.2	33.0	32.2	36.0	34.0	39.2	49.5	46.5
Massachusetts	31.3	28.0	35.1	32.6	28.2	25.6	22.8	20.0	15.2	15.6	18.6	19.3	19.1	18.5	19.0	20.4	20.0	19.5	30.7	27.5	22.4	38.0	19.2
Rhode Island	39.6	35.0	30.0	25.8	31.0	23.0	23.6	19.5	17.5	17.5	20.6	22.3	21.0	20.6	20.1	20.5	21.4	20.8	28.0	26.2	27.0	28.2	24.2
Connecticut	27.1	23.9	29.7	27.8	27.2	28.9	21.9	18.7	15.4	13.1	15.9	19.5	18.3	18.0	17.0	18.7	19.4	19.8	30.0	23.0	33.5	31.0	27.3
New England	34.0	32.4	34.9	30.4	30.7	30.7	24.8	22.5	19.9	19.7	22.3	24.3	24.0	22.3	21.8	24.5	25.4	29.5	38.6	33.7	36.6	47.6	37.6
New York	33.4	37.5	35.6	30.1	30.4	28.1	24.1	24.1	23.8	21.6	25.3	33.4	28.9	28.2	26.8	34.2	40.8	40.9	43.4	44.6	57.4	57.6	48.0
New Jersey	59.4	54.4	44.4	30.8	30.6	30.6	23.5	23.5	24.0	23.0	24.0	27.3	27.6	24.6	26.5	28.1	27.6	22.1	40.5	39.0	46.1	42.9	36.7
Pennsylvania	33.7	34.0	30.2	26.0	26.0	20.1	16.4	17.6	16.0	16.2	20.2	29.1	27.9	27.4	25.4	27.9	34.4	37.6	50.4	47.5	52.7	56.1	49.4
Middle Atlantic	35.4	37.0	33.7	28.2	28.3	24.5	20.4	21.0	20.1	19.1	22.8	30.9	28.4	27.6	21.8	24.5	25.4	38.0	46.5	45.6	54.3	55.8	42.9
Ohio	29.8	30.8	27.3	23.1	22.7	18.3	16.6	16.0	17.3	19.1	25.0	36.3	31.7	27.5	32.0	35.8	39.1	45.6	58.2	51.8	65.0	61.9	50.6
Indiana	26.8	25.8	23.6	19.2	19.2	17.1	16.7	16.3	20.2	24.0	27.5	42.2	39.6	37.0	38.3	45.6	52.6	51.5	68.8	56.0	64.1	59.6	57.9
Illinois	22.3	21.7	20.0	19.7	18.8	17.8	15.3	13.6	13.2	15.0	22.5	34.4	26.8	25.9	29.4	35.5	41.1	40.4	4143	40.0	42.2	39.1	41.0
Michigan	30.8	30.5	30.5	24.8	24.9	21.9	18.5	18.1	18.6	21.9	22.8	33.8	27.1	26.8	31.1	32.3	40.4	49.8	54.7	52.0	59.8	55.4	41.5
Wisconsin	18.9	19.8	18.2	18.1	18.1	18.1	17.1	14.1	13.3	14.1	21.7	21.9	19.2	19.9	19.6	27.9	41.3	47.5	58.5	53.4	56.5	62.7	56.6
East N. Central	25.8	25.8	24.0	21.0	20.8	18.6	16.8	15.6	16.5	18.7	23.9	33.9	29.0	27.4	30.2	35.5	42.7	46.7	56.0	50.4	57.4	55.5	49.3
Minnesota	18.0	18.5	18.4	16.8	17.7	16.8	13.9	14.3	15.1	20.2	24.5	29.2	34.0	31.7	34.8	37.0	43.4	43.9	53.2	46.0	51.0	59.6	53.6
Iowa	15.5	18.7	17.2	17.4	17.6	14.5	12.8	11.8	14.9	16.0	24.7	32.1	29.5	32.1	38.8	43.1	49.9	51.8	58.6	49.5	49.1	50.9	45.7
Missouri	29.9	29.9	27.7	26.7	26.1	21.8	18.2	20.0	20.3	22.6	27.1	36.9	31.6	33.0	37.7	40.4	56.2	62.0	69.6	63.7	74.0	69.6	64.0
North Dakota	23.9	23.9	28.6	26.6	26.5	17.9	12.4	10.7	13.7	14.0	14.6	13.8	14.0	14.4	26.3	39.9	58.9	57.2	73.5	68.3	66.3	71.0	71.5
South Dakota	16.7	20.8	26.9	21.1	21.1	18.1	9.8	10.1	9.8	11.6	12.6	15.2	18.0	25.2	34.1	48.9	64.5	70.0	71.7	61.0	64.7	69.7	60.8
Nebraska	23.4	26.2	26.4	26.5	27.8	20.2	13.5	10.7	14.7	14.7	18.8	20.8	21.2	20.8	20.0	28.3	47.1	52.8	62.8	57.2	59.0	56.7	50.4
Kansas	29.7	29.6	27.3	24.1	26.0	22.1	13.8	11.6	13.6	16.6	21.5	26.3	26.5	22.6	23.1	27.0	44.2	53.0	63.0	53.6	61.2	61.0	53.7
West N. Central	23.0	24.3	23.9	22.4	22.9	18.9	14.2	13.8	15.5	17.7	22.5	28.1	27.5	27.8	32.2	37.5	50.8	54.8	63.4	55.8	60.5	61.7	55.9
Delaware	22.7	20.9	17.9	24.4	24.4	19.0	19.0	14.7	16.0	17.5	20.5	24.1	21.0	17.9	20.4	19.9	20.0	36.3	46.5	44.2	48.1	46.0	39.3
Maryland	32.3	30.0	28.5	23.6	20.6	18.8	18.8	14.2	15.6	17.1	20.0	25.7	23.6	23.0	25.3	37.7	48.2	46.7	51.0	48.4	59.0	61.1	50.1
Virginia	23.2	19.3	17.3	16.3	16.3	13.7	9.8	14.6	12.6	16.8	20.6	30.2	28.1	27.4	27.5	29.8	29.9	32.0	41.2	39.5	44.7	41.5	30.0
West Virginia	30.1	28.2	22.5	19.1	23.6	18.5	15.7	18.3	16.0	13.6	17.9	26.8	23.5	22.1	18.6	15.9	28.0	29.1	40.0	36.4	47.1	52.0	40.0
North Carolina	25.0	21.3	19.1	19.2	19.1	16.5	11.0	13.5	19.0	20.0	25.4	25.0	32.8	30.1	26.2	23.6	26.0	32.6	39.0	41.6	42.9	40.8	33.8
South Carolina	18.0	14.7	14.1	14.4	14.2	9.7	11.0	13.7	19.8	19.6	21.3	24.2	28.4	23.5	30.4	33.1	36.1	33.5	38.8	37.8	38.0	48.7	38.5
Georgia	25.3	24.0	21.3	17.9	17.5	10.9	10.6	16.2	18.8	18.6	25.7	34.6	31.5	29.9	25.4	35.6	44.6	38.2	56.8	55.0	60.5	53.9	48.1
Florida	81.0	63.5	31.7	23.4	20.5	19.8	21.0	22.3	23.8	23.8	22.9	27.6	28.0	25.6	21.5	32.5	30.5	33.2	45.0	49.3	44.6	41.4	31.3
South Atlantic	28.0	24.2	20.0	18.3	18.2	14.5	12.3	15.3	17.6	18.5	22.7	28.0	31.2	27.0	25.8	28.8	33.1	34.1	43.8	43.4	47.4	46.6	39.4
Kentucky	35.3	31.0	30.5	25.7	30.0	27.2	19.0	21.0	20.1	23.4	32.9	37.5	31.0	37.6	37.2	34.7	39.7	56.1	66.8	68.0	74.1	70.9	51.0
Tennessee	29.1	25.3	21.3	18.9	18.5	16.7	18.0	19.5	20.0	23.5	31.7	39.3	40.9	37.2	33.9	36.8	49.5	61.0	66.2	62.6	68.8	63.1	47.5
Alabama	35.5	30.3	27.8	23.1	20.6	15.4	15.6	16.5	17.4	19.3	30.2	40.1	40.0	36.7	29.9	30.1	32.4	44.0	57.7	52.9	62.4	63.0	56.2
Mississippi	34.6	30.9	31.2	26.2	26.1	16.2	15.2	17.9	18.3	21.4	32.3	42.0	39.3	33.8	28.4	31.3	31.6	40.0	43.7	41.4	49.5	48.1	42.6
East S. Central	33.5	29.3	27.5	23.4	23.9	19.4	17.2	18.9	19.1	22.1	31.8	39.5	37.4	36.5	32.8	33.5	42.0	51.4	59.9	57.7	65.0	62.4	49.6
Arkansas	42.6	38.2	34.1	25.4	27.7	19.1	19.6	23.9	25.1	26.7	35.3	42.3	35.6	41.5	43.4	48.8	50.0	54.6	70.0	52.9	70.8	75.0	52.1
Louisiana	31.6	29.4	29.0	29.5	28.8	22.5	15.5	17.8	19.3	18.7	20.2	25.6	23.5	18.2	17.1	18.0	21.0	22.9	32.7	30.0	34.6	39.4	25.2
Oklahoma	33.7	29.0	25.0	25.0	22.9	15.3	15.4	17.6	16.4	15.2	20.5	25.8	31.5	35.9	36.5	43.0	53.5	57.1	66.6	56.2	68.4	73.8	57.7
Texas	32.4	29.4	26.3	24.8	22.0	14.7	13.6	14.8	17.1	17.1	19.4	21.9	27.9	28.2	28.4	33.1	41.7	41.0	58.0	50.9	52.2	53.5	47.0
West S. Central	34.7	31.1	27.9	25.5	24.2	16.7	15.4	17.6	18.8	18.8	23.0	27.0	29.7	31.4	31.9	36.7	43.7	45.2	59.3	52.9	57.5	60.7	47.8
Montana	30.1	35.2	45.5	49.8	46.6	21.0	15.0	15.5	18.6	24.2	32.6	27.6	24.5	27.0	30.3	39.6	36.6	48.3	61.4	58.7	67.5	67.5	57.5
Idaho	27.7	26.5	34.5	29.0	30.4	24.6	18.4	17.5	18.0	24.5	32.6	41.6	43.0	38.7	29.0	34.4	33.2	49.5	63.6	56.8	60.1	60.8	62.8
Wyoming	28.2	32.2	38.4	34.3	42.3	29.0	22.5	14.7	16.7	17.5	24.9	31.0	32.5	29.5	29.2	34.7	36.5	42.7	56.1	49.5	66.7	64.5	57.1
Colorado	33.9	35.7	30.0	37.6	39.5	24.5	16.0	18.5	18.7	19.4	25.3	37.4	37.8	38.3	37.0	36.8	35.0	53.8	65.2	57.9	72.2	69.0	60.3
New Mexico	49.2	50.1	35.9	35.9	44.2	34.4	22.0	19.2	18.6	19.6	22.6	31.5	33.0	31.7	34.7	36.8	35.0	35.9	54.0	51.2	50.5	54.0	48.8
Arizona	26.9	30.0	39.3	34.4	41.1	31.9	22.5	18.2	20.0	20.0	21.6	28.1	30.1	28.2	26.0	32.9	36.0	39.5	54.3	52.2	56.8	56.1	60.0
Utah	23.0	22.0	23.0	18.2	27.2	14.7	13.1	12.4	11.1	11.5	13.0	18.5	19.0	17.9	17.2	16.6	17.8	21.5	34.9	29.0	44.1	43.1	43.0
Nevada	20.8	23.8	21.7	25.7	29.5	31.2	23.5	14.2	12.0	13.2	15.0	19.0	20.3	18.5	19.5	20.4	25.0	23.4	38.8	36.2	38.0	44.0	45.2
Mountain	32.0	33.7	34.8	35.6	38.7	24.8	17.6	16.8	17.5	20.2	25.9	32.1	32.2	31.6	30.4	33.7	32.7	44.0	57.7	52.6	61.5	60.7	56.2
Washington	34.8	35.7	35.5	29.7	29.6	25.3	18.4	18.1	20.0	25.1	32.9	42.4	40.3	33.6	36.6	41.3	34.6	41.7	63.5	60.3	69.3	72.2	58.6
Oregon	29.7	34.1	37.4	31.0	38.9	34.9	27.6	25.4	26.4	28.4	33.8	41.0	41.4	38.0	37.8	46.5	50.4	59.1	68.5	63.6	72.6	71.8	61.0
California	38.5	37.5	32.3	20.4	26.7	15.1	22.3	21.4	19.2	23.5	33.4	43.3	42.0	36.3	33.1	33.3	55.0	57.6	68.1	59.7	66.5	68.6	52.1
Pacific	35.6	36.3	34.3	28.3	30.1	22.1	22.3	21.3	20.9	25.0	33.3	42.6	41.4	35.9	35.1	38.3	48.4	53.5	66.9	60.7	69.6	70.3	55.8
United States	29.6	28.3	26.3	23.5	23.7	19.0	16.2	16.8	17.8	19.4	24.8	31.5	30.5	29.7	30.2	34.1	41.7	45.8	55.9	51.5	57.4	57.7	49.0

FORCED SALES AND RELATED DEFAULTS. Foreclosure of mortgages, bankruptcy, etc. Also sales resulting from delinquent taxes. Number of farms changing ownership per 1000 of all farms for the 12 months ending March 15 of each year.

State and Geographic Division	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Maine	17.8	16.5	14.0	18.8	17.0	14.3	23.7	30.3	30.8	27.4	25.4	20.3	18.1	17.5	16.9	14.9	12.4	14.0	9.5	4.9	3.6	5.7
New Hampshire	13.0	13.8	14.1	7.1	10.8	11.6	16.4	23.7	19.3	18.8	13.0	11.7	10.5	10.1	9.9	11.2	8.0	7.4	5.5	3.7	2.5	3.4
Vermont	13.2	12.5	10.0	8.9	9.8	9.8	11.4	17.1	19.5	20.7	19.3	19.1	18.6	17.3	17.8	16.7	15.2	10.9	6.7	5.5	5.4	4.8
Massachusetts	7.6	8.0	7.0	8.4	9.8	5.2	10.5	13.4	15.9	17.1	14.6	11.8	11.0	10.5	10.4	10.4	11.0	9.2	5.6	4.3	2.2	2.2
Rhode Island	16.2	10.5	3.7	6.5	3.1	2.8	5.0	4.9	5.0	4.7	5.5	5.3	4.4	4.8	5.0	4.3	3.7	3.6	3.1	1.8	.9	.7
Connecticut	15.1	9.0	4.0	3.9	4.2	5.5	11.1	8.9	6.8	3.5	3.5	3.8	3.4	3.4	4.2	4.7	4.0	3.4	2.5	1.4	1.0	.5
New England	13.8	12.4	10.7	10.9	11.2	9.7	15.5	19.8	20.1	18.9	16.8	14.4	13.3	12.7	12.7	12.0	10.6	9.8	6.5	4.2	3.0	3.6
New York	14.9	16.6	17.4	17.2	16.6	16.4	19.9	33.3	31.9	27.4	21.3	17.0	15.0	13.7	11.8	14.9	10.0	6.7	3.7	2.2	2.3	1.9
New Jersey	10.6	9.4	10.9	6.0	7.6	10.9	16.0	25.6	22.8	22.8	23.0	19.5	17.8	18.1	20.9	22.1	10.2	8.9	6.8	4.1	2.4	2.5
Pennsylvania	8.9	7.7	7.2	8.0	10.7	11.8	16.6	24.0	21.3	20.5	21.6	15.5	12.6	12.6	13.3	11.7	6.7	6.4	2.7	3.1	3.1	2.2
Middle Atlantic	11.8	11.8	11.8	12.0	13.1	13.8	18.0	28.3	26.2	23.9	21.6	16.5	14.1	13.5	13.2	13.9	8.5	6.7	3.4	2.8	2.2	2.1
Ohio	12.8	13.6	13.2	14.8	15.3	18.8	24.5	34.1	22.8	19.5	18.9	14.4	9.7	9.5	9.3	6.8	6.2	3.8	2.5	2.2	2.3	2.0
Indiana	18.2	22.3	23.6	21.1	27.6	27.8	42.0	44.9	33.3	26.1	19.4	19.3	12.3	11.7	10.4	11.0	7.7	2.9	3.2	1.5	1.6	1.5
Illinois	17.1	18.6	21.0	18.6	21.1	23.0	34.5	50.7	38.2	25.1	24.5	19.4	11.8	11.3	10.2	8.0	5.5	3.2	2.7	.9	.6	1.2
Michigan	21.2	25.2	25.0	21.8	30.1	28.5	40.0	50.4	36.5	22.8	22.5	15.8	13.1	13.7	15.9	12.4	8.4	4.4	4.2	2.0	1.4	1.0
Wisconsin	27.2	24.5	22.7	20.0	19.7	23.6	33.1	40.4	30.9	24.5	25.6	27.5	21.8	22.7	21.4	20.2	9.8	11.5	10.6	6.8	4.0	2.7
East N. Central	18.9	20.4	20.7	19.1	22.3	24.0	34.3	43.9	32.0	23.5	22.1	19.0	13.5	13.5	13.1	11.3	7.4	5.0	4.4	2.6	1.9	1.7
Minnesota	30.6	29.2	31.9	30.1	31.6	38.9	50.3	67.2	42.5	28.8	30.4	25.0	23.5	22.4	22.8	16.9	13.6	8.9	7.8	5.7	3.3	3.4
Iowa	29.5	29.8	30.4	27.2	27.3	28.1	58.8	85.7	55.5	40.1	30.1	19.3	12.2	13.0	12.6	7.1	4.0	2.1	1.1	1.1	.8	.7
Missouri	23.8	26.7	27.8	25.2	30.0	27.9	50.1	59.8	41.6	35.8	35.9	31.9	27.0	25.3	21.9	15.1	6.5	4.2	3.8	1.7	1.1	1.4
North Dakota	59.0	61.1	55.9	42.7	42.3	50.0	76.0	92.9	43.3	24.9	32.5	31.8	32.9	44.4	49.4	49.5	42.4	29.3	20.7	10.1	4.3	3.5
South Dakota	66.1	66.1	57.9	35.0	35.0	43.4	67.3	103.1	86.8	78.7	77.6	68.7	53.6	50.4	48.3	37.1	23.0	20.7	13.4	9.5	5.3	4.6
Nebraska	24.1	28.5	28.3	17.6	17.0	24.4	39.0	63.9	51.0	45.0	44.1	42.4	38.9	39.9	36.7	32.9	24.3	15.2	7.6	5.1	2.4	1.3
Kansas	18.8	18.9	23.0	14.5	17.4	23.4	43.1	61.1	55.6	48.0	38.2	29.0	25.2	25.7	27.8	27.9	13.4	15.2	11.2	3.9	1.7	1.0
West N. Central	30.8	32.0	32.4	25.9	27.5	31.3	52.5	72.0	50.9	40.6	38.0	31.7	27.0	27.4	26.7	21.8	14.0	10.4	7.4	4.1	2.2	1.9
Delaware	12.8	12.5	10.0	11.4	7.0	13.7	16.0	25.0	22.4	21.4	21.6	17.0	12.4	9.3	12.6	8.9	9.6	5.9	2.3	1.3	.6	.6
Maryland	14.2	17.2	17.4	18.7	20.6	16.1	34.3	32.5	28.4	19.9	20.4	13.6	11.5	9.5	9.4	10.1	3.5	4.5	2.3	1.2	.8	.7
Virginia	17.0	14.3	14.6	14.1	13.0	21.9	38.8	43.3	33.2	19.7	18.9	21.7	14.2	14.9	13.3	13.9	6.7	3.7	3.7	2.6	1.5	1.4
West Virginia	15.4	17.2	17.8	16.6	19.5	27.1	45.4	67.1	52.7	28.0	24.2	18.7	15.8	16.1	11.9	8.9	6.2	5.0	3.2	2.8	2.1	1.4
North Carolina	14.6	20.1	22.4	28.7	25.8	42.3	68.2	86.6	54.7	32.3	25.9	17.1	13.4	12.3	11.9	10.3	6.3	3.4	3.4	1.7	1.3	1.1
South Carolina	26.7	30.7	36.2	33.9	40.5	49.0	53.8	60.2	33.5	24.3	20.5	19.6	14.8	13.4	13.5	13.2	8.5	5.3	4.6	2.1	1.7	2.1
Georgia	28.9	27.9	29.7	25.1	24.0	33.3	36.8	48.6	36.2	18.3	16.5	13.8	12.7	13.6	10.5	11.9	8.8	4.6	3.6	3.9	1.8	1.3
Florida	16.1	15.1	24.1	14.6	13.1	7.3	18.5	46.0	29.6	23.7	18.8	15.2	11.3	11.5	10.0	9.5	9.8	9.3	9.0	6.3	6.8	3.8
South Atlantic	19.5	21.0	23.3	23.0	23.2	32.2	47.1	59.5	40.7	24.5	21.3	17.6	13.6	13.4	12.0	11.5	7.3	4.5	3.9	2.7	1.9	1.5
Kentucky	17.2	23.6	24.1	16.1	19.0	22.4	39.8	48.0	26.2	21.8	21.3	12.9	9.8	10.5	8.6	10.1	5.4	3.3	2.6	1.3	.7	.9
Tennessee	16.0	19.8	17.4	11.9	11.1	14.5	33.1	48.7	32.6	22.3	18.4	17.8	14.3	13.0	9.7	9.8	5.8	4.4	2.7	2.4	2.3	1.7
Alabama	13.0	15.7	14.3	10.9	11.2	28.1	42.8	56.1	34.8	25.0	19.2	15.3	9.8	11.4	14.1	12.3	6.7	6.0	3.6	3.2	3.8	2.1
Mississippi	20.0	29.1	24.2	23.3	24.8	44.2	99.9	115.3	101.4	61.9	55.8	51.2	24.9	17.9	13.1	9.8	12.8	5.5	5.7	2.5	1.5	2.3
East S. Central	16.4	21.7	20.0	15.2	16.1	25.9	50.6	63.5	44.9	30.6	26.9	22.4	14.0	12.8	11.1	10.5	7.3	4.6	3.5	2.3	2.1	1.7
Arkansas	20.7	22.9	20.9	20.8	20.6	26.9	60.5	64.1	50.5	29.4	29.4	31.4	23.0	18.6	17.7	13.3	7.0	5.9	3.5	1.6	2.0	2.2
Louisiana	22.8	20.9	23.7	20.0	21.8	21.8	45.8	75.4	64.1	35.3	27.1	18.7	12.8	12.6	11.6	11.3	7.9	5.1	3.0	3.2	1.9	3.2
Oklahoma	30.7	32.4	29.0	17.5	21.6	32.2	47.7	64.3	31.5	20.4	22.0	19.2	16.8	17.1	16.4	15.8	15.4	9.9	8.4	3.9	4.3	3.2
Texas	10.9	12.3	10.9	10.3	11.4	15.7	25.9	32.8	20.6	18.1	17.5	16.1	14.5	14.2	11.9	7.5	5.5	4.1	3.0	2.3	3.3	1.8
West S. Central	18.7	19.9	18.5	15.2	16.8	22.4	40.2	51.2	34.3	22.9	22.0	20.2	16.5	15.5	14.0	10.0	8.3	5.8	4.3	2.6	3.1	2.3
Montana	70.9	69.0	56.4	39.2	47.1	60.2	69.6	67.9	52.9	40.8	42.1	45.2	31.4	28.5	21.4	24.9	17.9	16.5	11.1	3.1	3.7	2.1
Idaho	47.4	40.7	43.0	31.6	30.7	37.5	46.3	41.0	29.1	27.5	28.3	30.8	20.4	14.1	12.1	11.5	7.2	5.5	2.5	1.7	1.7	1.3
Wyoming	42.4	39.3	32.2	26.8	30.4	30.5	41.2	41.3	43.0	39.0	30.2	21.8	16.3	16.7	20.8	17.8	10.1	6.0	7.1	4.0	2.2	3.2
Colorado	57.0	46.5	38.1	33.6	28.2	26.2	38.5	74.5	66.4	48.4	49.3	36.9	35.8	29.8	23.3	21.4	18.5	12.9	7.7	3.3	2.6	2.4
New Mexico	37.8	35.7	26.0	18.4	16.5	26.2	23.8	33.9	28.8	29.2	29.2	29.4	27.0	27.5	22.9	24.0	15.1	9.3	7.5	4.0	2.3	1.5
Arizona	53.9	45.8	43.8	23.4	21.0	32.9	40.3	34.1	27.5	22.4	17.3	19.8	19.1	17.1	16.0	17.4	10.8	6.9	5.2	4.5	3.6	2.6
Utah	23.4	25.5	27.7	16.5	19.2	33.0	31.2	37.4	31.4	24.8	26.6	27.6	23.8	24.0	22.4	19.5	15.2	9.5	6.8	5.5	4.1	2.5
Nevada	30.9	26.6	19.7	10.8	13.2	25.9	35.0	27.2	25.3	22.0	22.7	19.5	18.9	18.2	18.6	17.8	12.2	7.4	5.6	4.1	2.6	1.6
Mountain	50.2	45.3	39.4	29.1	29.4	36.4	43.5	52.8	44.1	35.7	36.0	33.4	27.3	24.2	20.3	20.0	14.5	10.7	7.1	3.4	2.8	2.2
Washington	28.5	29.0	23.3	19.2	19.1	28.4	36.5	44.5	36.9	31.4	31.8	31.9	22.7	21.1	17.4	11.0	6.0	4.3	4.8	2.2	1.5	.6
Oregon	20.7	21.2	23.9	15.2	14.9	20.4	31.8	41.3	30.4	24.4	26.1	25.3	22.9	17.3	20.3	16.5	15.8	9.0	5.3	2.8	2.5	1.6
California	16.3	15.0	16.5	17.7	13.3	24.9	40.6	45.0	40.0	21.0	22.3	17.5	15.6	15.7	16.0	14.4	8.2	7.5	4.6	3.1	1.6	1.3
Pacific	20.6	20.1	19.9	17.5	15.2	25.0	37.6	44.1	37.1	24.6	25.8	23.1	19.1	17.5	17.3	13.9	9.2	7.0	4.8	2.8	1.7	1.1
United States	21.6	23.3	22.8	19.5	20.8	26.1	41.7	54.1	39.1	28.3	26.2	22.4	17.4	17.0	15.9	13.9	9.3	6.6	4.9	3.0	2.3	1.8

Based on Data of U.S.D.A.

VALUE OF FARM BUILDINGS
PER ACRE,1940



Building values in 1940 averaged about 31 per cent of the value of land and buildings. There is a general similarity in the geographic distribution of the value of farm buildings and the total value of all farm property.

The investment in buildings is influenced largely by such factors as the extent and character of livestock enterprises, climatic conditions, tenant or owner operation, social standards, and maturity of the area.

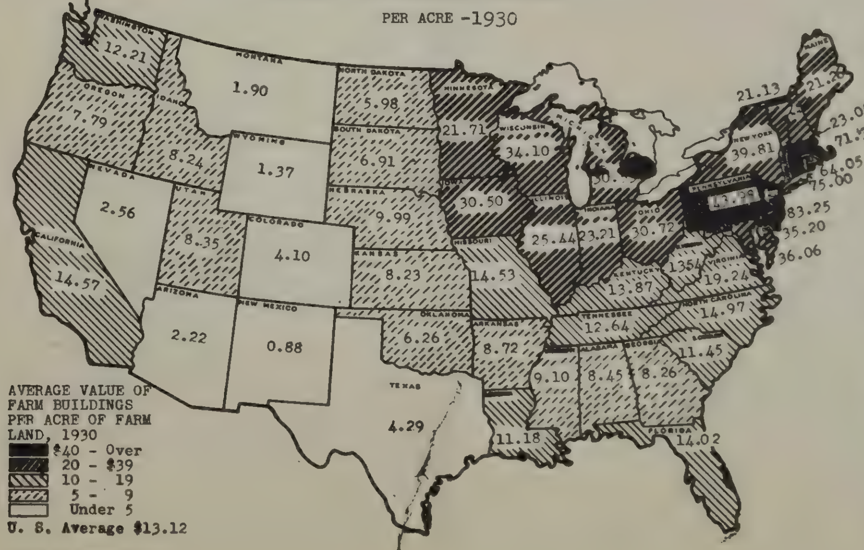
Primarily because of larger farms and ranches, building values averaged less than $5.00 per acre in Texas and 7 mountain states; the low was 72 cents per acre in New Mexico.

In the New England and Middle Atlantic states the average value of buildings per acre was in excess of the value per acre of the land alone.

Average building values per acre declined in every state except Rhode Island during the 10 years, 1930-1940. The U. S. average dropped from $13.12 in 1930 to $9.81 in 1940, a decrease of $3.31 or 25 per cent. This undoubtedly reflects at least two major influences:

1. Serious neglect of buildings due to low agricultural income;
2. Reduced need for buildings in many cases due to
    a. Larger farming units, and
    b. Changing farming systems and methods.
    The mechanization of farming is the primary factor that is inducing these changes.

VALUE OF FARM BUILDINGS
PER ACRE -1930



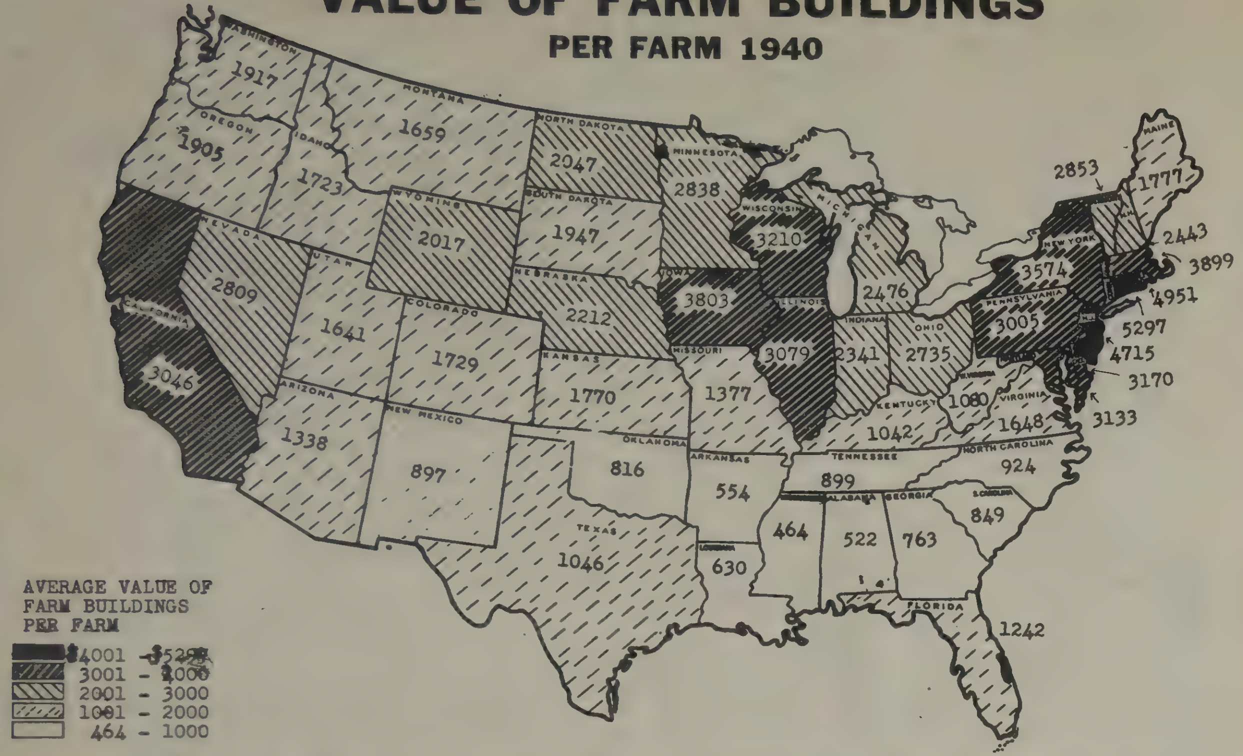
Based on Census Data

In recent years there have been diverging lines of thought on the question of investment in farm buildings. The opinion is expressed by some that farms are unnecessarily burdened with investments in buildings and that the resulting overhead expense is not economically justified. The other theory is that farmers receive good returns from building investments and would be justified in constructing additional efficient, well-planned buildings.

There is perhaps an element of truth in both schools of thought. Rather than a blanket application of either one theory or the other, it is probable that the correct and most economic procedure is to adapt the building investment to the type of farming, size of farm unit, and productive ability of the soil.

VALUE OF FARM BUILDINGS

PER FARM 1940

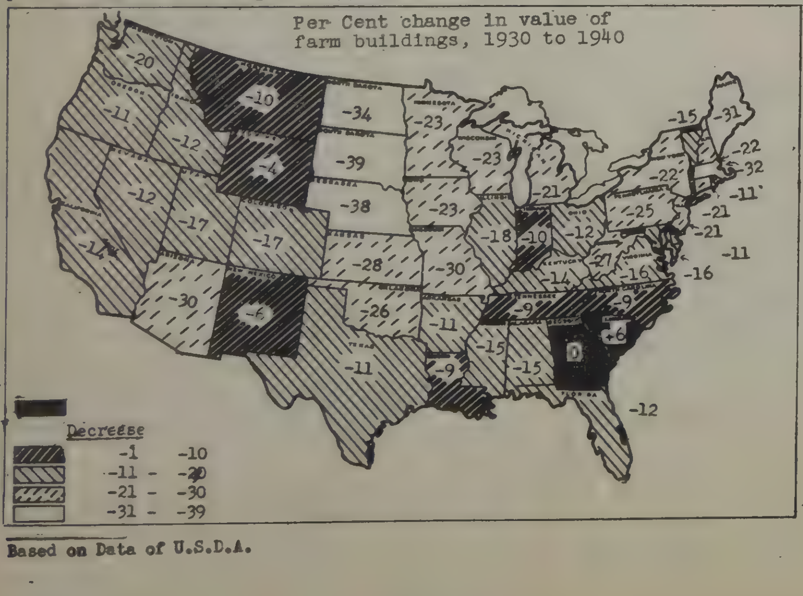


Total farm building value per farm varies widely from one section of the country to another depending on such factors as the following:

1. Size of farm is probably the most important single factor effecting value of building per farm. (See Page 411)
2. Type of farming is a dominant reason for the large investment in buildings. Note the high building investments in the northeastern dairy regions.
3. Climate is an overall influence which tends to increase the building investment in the north. The cheap tenant buildings of the south would hardly provide sufficient protection against the severe winter of New England or of the northern Great Plains. (See Page 731)

Per farm investment in farm buildings has declined at the rate of 1.9 percent per year for the last ten years. This reflects the severity of the adjustments which have been occurring in agriculture in the last decade as a result of:

1. General Depression - countless farmers all over the nation were able to avoid foreclosures and ruin which came to so many only by lowering their standard of living and applying money normally required for maintenance and new construction of farm buildings against interest and principal payments. Recovery was slow and many farmsteads still show the neglect of these years. Buildings on foreclosed farms were often neglected both by the borrowers before foreclosures and by the lenders after the farms were acquired. In many cases complete sets of buildings disappeared.


Per Cent change in value of farm buildings, 1930 to 1940

2. Severe Drouth - in 1934 and 1936 the two most severe drouths of record covered all major farming areas. Drouth persisted in the great plains until 1939 and 1940. In the Dakotas and Nebraska building values declined more than 3.5 percent per year -- more than one-third during the 10 years 1930 to 1940.

3. Shift to Power Farming - tractors require a minimum investment in housing space. This shift has been most important in the Wheat Belt and in the Corn Belt.

The value of farm buildings per farm, depending upon the factors such as herein discussed, are a key to the effective equipment and capacity of individual farms. Without proper buildings a farm may not be operated according to the most adapted type of farming.

Based on Data of U.S.D.A.

FARM BUILDINGS—TOOLS OR TOMBSTONES

If the past gives the answer, it's easy—tombstones. "When once built it will do for a lifetime". "Build it and be through with it". These have been our mottoes. The fact that we are living in a house or using a barn that is over 40 years old is a source of great pride. Are these views correct?

We want up-to-date types of livestock and seed, and tractors and trucks. When a more efficient type or variety comes along we are quick to purchase it if we have the money. Why have we applied the yardstick of "modern" against all our farm improvements except buildings?

The only answer seems to be that we have not thought the problem through. We have taken the attitude of the past, as far as buildings are concerned, as being correct for today. Now is a good time to begin to think straight on this important subject. It is important for many reasons. Here are a few:

1.-In some areas half the total farm investment is in improvements.

2.-We spend about one-half of our total work hours in and immediately around the buildings.

3.-The most accurate estimates indicate that farmers expect to spend large sums in the post-war period on their improvements. (One company in Illinois says $4,000,000.)

These facts warrant some serious thinking on the function of farm buildings and what should be done about them.

It is probable that more will be spent on repairing and remodeling (some say 75% as against 25% for new buildings) than on new structures. Another estimate is that there will be an average of one new building per farm.)

MODERNIZING

For those who expect to hang on to the old buildings, here are some suggestions:

Make plans that are based on making the old building modern rather than simply repairing it. Barns filled with horse stalls, small grain bins, and feeding alleys have little about them that applies to the use of the power that took the place of the horses—tractors. Neither are they adapted to feeding barns. We should think of the barn in two parts, the shell and the interior. Determine whether the shell is worth saving. It may be that only a new roof of modern material or some siding or repair to the foundation is all that is needed. These jobs are not necessarily expensive. If, when completed, a solid useable shell results, then these changes should be worthwhile.

As for the interior, we should first consider what it will be like when all of the permanent interior is removed. Determine how much framing has to be left to hold the barn together and in line and support the loft—if it is to be left.

The farmer who finds he has a clear or almost clear interior is indeed fortunate. This makes it possible to plan widely and with few limitations.

The next point is to determine the greatest farm need—

A feeding barn for cattle or sheep,
A loafing barn for dairy cows,
A commercial hen house, or
Storage for feed to be moved to some other place for feeding.

Remember that the rearrangment of the old barn from the standpoint of making it modern for up-to-date operations must provide for cutting down labor, better handling of feed and stock, plenty of ventilation, insulation in some cases, and maximum use of all space. The new idea of building equipment is to think of it as barn furniture. This means that it can be moved and shifted about just as the wife moves the tables and beds. This also means minimum expense if at a later time an entirely new use is found for the barn.

In working out the modernization plans, full use should be made of books and bulletins showing building plans and new modern arrangements. Not only will good ideas for new uses become apparent, but new kinds and types of material will be shown. Farmers now have a wide range of selection from which to meet any need or problem. Wood, steel, gypsum, concrete, tile, glass, and many grades and kinds of fiber board are available. All should be considered so that the best material for the specific purpose is used. Most material manufacturers will supply special literature on the best use of their products. Farm journals will give names of reliable firms and lumber dealers who have a large volume of modern plan books that can be consulted, bought, or borrowed.

NEW BUILDINGS

Now is the time to plan for the new building before—long before—actual construction starts. The old idea of having the local carpenter build a new building for you exactly like the one he built for Bill Smith is the poorest way of all ways for doing it. The new farm building must fit your specific needs, your farm, and your operating plans. It must work for you just as your tractor, combine or livestock does. A building, to be worth its cost, should be thought of in terms of what it will do, how it will save labor, preserve or improve the stock or crops that use it, and continue to perform these services every month of the year. The farmer is fully aware of his potential loss when his farm hands work but part time, his cows give milk but six or eight months of the year, or his horses go to the field but half the time. The rules which make such factors unprofitable also apply to buildings. They must work, perform, do things 8,760 hours a year. When they do this they are good investments.

One more thought about the new building: It is as impossible to plan a building now that will efficiently fit modern needs ten years from now as it is to pick a tractor today and say it will be modern and up-to-date ten years hence. When planning the new structures, think of them in terms of many uses and alternate uses for the future. Plan so that they can be inexpensively changed to meet tomorrow's needs.

The many ways which are now under test and consideration for the one item of making hay illustrates the point. Will we, in the future, barn cure it, dehydrate it as a plant, chop it, bale, or put it away loose? No one can answer that question. We can say that many of the practices we called modern yesterday will be very much out of date in less than ten years.

The yearly cost of owning a building ranges from 8 to 10 per cent of the original cost of construction without consideration of interest return on the money. Taxes, insurance, depreciation, and maintenance make up these costs. The $1,000 building must therefore earn $80.00 to $100.00 a year in order to break even. This means that the new and modern view is that buildings must be, and can be, tools. When properly modernized or newly built, they can be made profitable tools that earn money, save labor, and become a joy and source of pride to the owners.

By D. Howard Doane, Chairman of the Board, Doane Agricultural Service, Inc.

BUILDINGS ARE TOOLS

By True D. Morse
President, Doane Agriculture Service, Inc. and Editor, D.A.S. Agricultural Digest, St. Louis, Mo.

SERVICE buildings on farms are tools of production. There is no other reason for them. Every farmer should have buildings which are highly efficient tools.

What should be expected of farm service buildings?

1. They should save labor—the most costly item on many farms. If a 50-pound feed basket is uselessly carried on four trips twice a day, it adds up to the big task of carrying 73 tons each year.

Doors at correct locations, feed bins, mangers and hay racks properly placed, and modern equipment, suggest a few common items that permit a minimum use of labor. Storage of feed at the point of use may be of primary importance.

Inefficient buildings are a constant drain on profits.

2. Buildings should provide low-cost storage that helps, maintains or improves quality. Any waste and depreciation of quality is a cost of storage.

BARN curing of hay, drying of high-moisture corn and other operations like cleaning of seeds and grain will be expected of buildings in the future.

3. Buildings should increase livestock production. Health, comfort and protection are involved. Costs must be kept within reasonable limits.

Each farm enterprise should be charged with a building rental sufficient to cover interest on the investment, taxes, insurance, depreciation and maintenance. Any rental in excess of the minimum required for adequate shelter, sanitation and convenience is a loss.

A dairy cow, on an average, should not be required to pay more than about $10.00 per year for the use of buildings. For hogs, the annual charge per sow should be less than $3.00; for each hen, 18 cents per year or less.

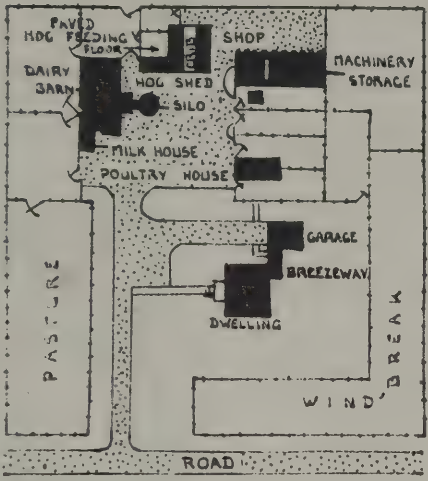
Health is a major consideration in housing livestock and poultry. Too close confinement may be as detrimental as lack of proper shelter.

Before spending money on buildings, a complete, well-organized, long-time farm operating plan should be developed. How else can buildings be made to conform to the needs of the farm? What crops will be grown? What portions will need storage? What kinds of livestock will be kept and what will be the numbers of each? Will storage be required for purchased feed, in addition to that grown on the farm? How much machinery will there be? Must storage be provided for fertilizer and other such supplies? After all such data are worked out you can plan to build or remodel buildings intelligently.

How about locations? Here again, a complete, long-time farm plan should precede the planning. Where will the hay be produced and where fed? What fields will be permanent pasture and which will be used for rotation pastures?

Pioneering or trial and error development of farms no longer have a place in our maturing agriculture. This is an age of management. Any farmer or farm owner who fails to precede new building or even major building repair work with a careful and complete analysis of the needs of the farm is following a short-sighted policy which may prove costly.

Most major buildings are twenty-five to fifty years of age. Unless remodeled, they stand as monuments to obsolete systems of farming. To continue to use them in their present condition is like using a 1920 tractor or a horse-power hay bailer.



A Dairy Layout - U. of Ill.

Older structures need repairs. What an opportune time to completely modernize and bring them up to date! Repairs should make them better adapted to the present system of farming. Horses have been replaced by tractors, and soybeans now use land formerly in oats, wheat or corn. Combines have replaced binders, hand milking is giving way to rapid mechanical milking, and in many other ways mechanization has ushered in a new era in farm structures.

Hay and more livestock often come with soil conservation programs and buildings should be brought up to date to conform to such changes.

A capable manager will study every conceivable way of altering the building to give more capacity, to save labor, and to otherwise meet present-day needs. The procedure often is to replan the entire interior arrangement.

Assume there are no partitions. Lay out in a diagram merely the outside walls and any permanent features like pillars. Proceed then to diagram several floor plans that will give maximum use of the space available. With such diagrams, it will be much easier to select the one best adapted to the farm. When the new plan is complete, it may then be possible to adjust to save some of the present inside construction such as partitions, granaries, etc.

Ohio State University has some eight floor plans for a barn 26 x 36 ft. in size. Any can be adopted, depending upon the type of farming and the primary farm enterprises.

A lot of buildings 50 to 100 years old have solid framing more costly and of stouter construction than many of the newer farm buildings. Be slow to tear down old buildings. After breakage, there is usually a surprisingly small amount of lumber that is usable. It is easy to tear down and start anew. Often you can get similar results at less cost by modernizing old buildings.

On the farm where I was born, the hewed frame erected over 60 years ago now supports a nice appearing red barn which has been modernized to efficiently serve the needs of the present owners.

If you try to get by without proper buildings, usually your losses soon equal the cost of the buildings—and you still do not have the buildings. A seed house on a Mississippi plantation paid for itself the year it was built. The owners had lost the price of the seed house every one to three years, yet had no building.

Modern portable hog houses need only to save one or two more pigs per litter or produce healthier and more rapid-growing hogs to pay for themselves in one or two seasons. Even so, see how many farmers still farrow in disease and worm-infested barns and hog sheds—paying in losses year after year for the best of modern equipment and never owning good hog houses.

The effectiveness with which the accumulated $12,000,000,000 of liquid assets of farmers will be used in the post-war period will go a long way in determining the degree of prosperity for both farmers and rural communities in the years ahead. Much of it will be spent on buildings. There is a 30-year deficit in building repairs and construction. There should be deep concern that the money to be spent on buildings will not involve excessive waste.

Before you spend, be sure you will have efficient structures at a reasonable cost that are working tools adapted to the present and future needs of your farm.

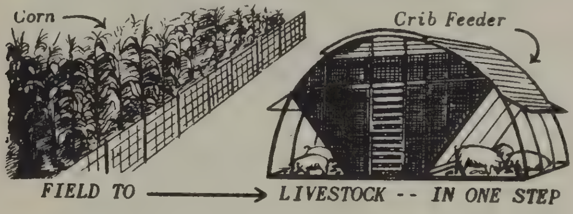
BUILDINGS AS TOOLS
FIRST IN A SERIES DEALING WITH FARM BUILDING PLANNING

HOW TO PLAN FARM BUILDINGS THAT WORK AS TOOLS

Make Buildings Feed Livestock

Farm buildings must do just that -- feed our livestock. Not until crops can be moved from field to livestock in one step, will farm buildings be properly designed. Buildings must work as tools -- the same as the tractor in the field -- must function, perform, do things!

Our farm buildings must reduce hours of work, leg mileage, human effort and drudgery. All problems are not answered, nor will they be in this world of fast changing agriculture, but there is a lot that can be done to eliminate or reduce time-consuming jobs, increase volume, and make buildings real money-making tools.


Corn
Crib Feeder
FIELD TO → LIVESTOCK -- IN ONE STEP

Make Livestock Pay For Buildings

The livestock using a building should pay for it. Their ability to pay rent depends mainly upon two factors.

1. The volume of production -- pounds of milk, pork, beef and dozens of eggs.

2. Price received for the products.

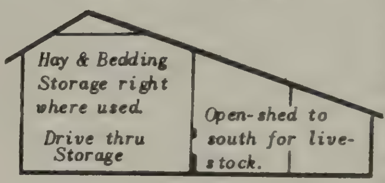
Building costs have not been given proper weight because farm buildings have been considered a "necessary evil". Barns were built because "I need a barn". Too often livestock buildings are paid for by the sweat and toil and reduced earnings of the operator.

A 1929 Wisconsin Dairy barn cost $300 per cow. The 15-year income record, including the high priced war years, showed that the cows were actually paying off a capital investment of only $110 per head. The farm land was paying for this "fine" barn, not the cows!

It's a plenty tough job to design buildings so livestock can pay for them. Today it's harder than ever but Doane designing, building and testing under practical management has shown how to do it. (The amount that livestock can pay for buildings will be covered in future releases of this series).

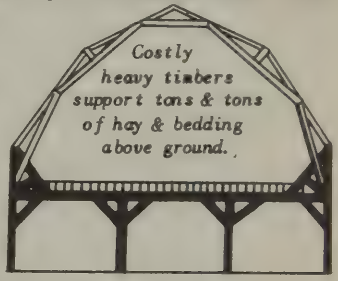
Don't Build A "Grandpa Barn"

Modern Pole Frame Barn


Hay & Bedding Storage right where used.
Drive thru Storage
Open-shed to south for livestock.

Thousands and thousands of dollars are being spent to build barns today that are as obsolete as the old Model T. Good dollars are spent for heavy footings, reinforcing, timbers, girts, joists and massive frameworks to support tons and tons of hay up in the air when the good old earth will support it for nothing.

''Grandpa's Barn'' Too Often considered 'Deluxe Models'


Costly heavy timbers support tons & tons of hay & bedding above ground.

And, when the "Grandpa Barn" is complete, work just begins. Hay must be hoisted to great heights, the operator must climb up into the mow, lug hay to chutes, poke it down and then it still must be distributed to the livestock.

These barns enslave the operator with both high costs and extra labor. So much progress has been made in recent years in building design that anyone now following standard practice is sure to forfeit labor efficiencies and burden himself with unnecessary costs.

Build For Usability

Farm buildings should not have long life -- UNLESS they are portable, versatile, or easily changed for many uses. They should give the most years of use for the least cost.

All parts of a building should have the same life. The late Henry Ford did not change to plastic parts because they were any better than steel, but because they were "good enough". He saw little sense in making a gear shift knob so strong that it would last 50 years if the car as a whole would operate for only 10 or perhaps 15 years.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
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HOW TO PLAN FARM BUILDINGS THAT WORK AS TOOLS

Obsolescence is running its course with our "Grandpa" type buildings. The old barn, hog house, or feeding shed may be just as expensive to use as the out-of-date tractor with its high fuel consumption and low labor efficiency. Build so the structures will last long enough to pay for themselves and earn a good return on the investment. Do not plan to keep them in use so long that they become obsolete and operating costs exceed returns.

Make Buildings Portable

When possible put "the skids" on your new buildings. Portable hog houses, poultry brooders and houses, crib-feeders, hay feeders and even portable cattle barns all lend to greater efficiency.

Four urgent reasons for building portable structures are:

1. Sanitation -- when buildings are moved to clean ground, sanitation problems are reduced.

2. High costs of labor -- less time is required to move portable buildings to the crops than to move the crops to permanent buildings.

3. Soil fertility -- manure is left out on the fields where it belongs.

4. New farming methods -- portable buildings are more flexible in meeting fast changing ways of doing farm work.

Build For Many Uses

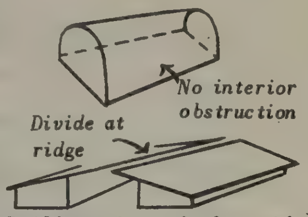
If buildings are to be a good investment they must provide 12 months of service each year, year after year. A barn with permanent "furniture" -- like feed mangers, stanchions, bins and partitions seldom provide maximum hours of use.

A portable "A" type hog house is too cold for early farrowing, too hot for summer litters, too small to shelter shoats and too low for easy cleaning. Buildings which have such limited use are poor investments in spite of their low cost. They fail in two most important building requirements: First, complete year around facilities for the livestock or crops for which they were intended, and second, good facilities for other or alternate uses. Build "many uses" into farm structures by:

1. Constructing only a shell -- walls and roof.

2. Using moveable interior equipment.

3. Making structures portable when possible. Use Doane's sectional principle for larger buildings.

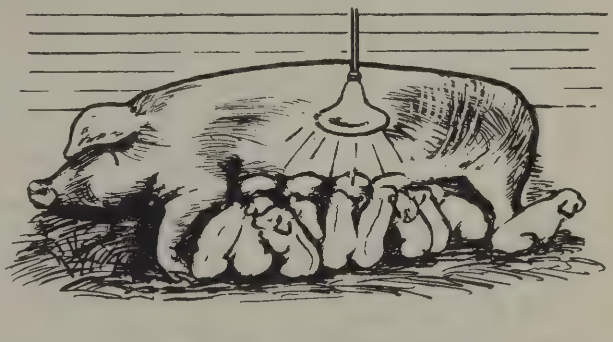


Buildings 20 to 30 feet wide can be moved one section at a time thru 12 foot gate

Reduce Ventilation And Insulation Costs

Producing animals give off heat as a by-product of their production. The higher their production the more excess heat they give off. When animals are enclosed in a warm structure where they can't give off this heat fast enough, production is retarded.

The inside temperature of a building should be close to the outside temperature for healthy livestock. Provide protection from the extremes of weather and supply concentrated heat only where needed for young animals and poultry.



Apply heat only where needed.
No brooder necessary.

Even in northern climates dairy and beef cattle will show equal or better results when given free run of an open shed, as compared to a costly warm barn.

Save costs by:

1. Using open loafing sheds -- a dry bed out of drafts and fresh air is all that is needed.

2. Using concentrated heat -- heat applied to small areas saves cost of heating the whole building.

SECOND IN A SERIES DEALING
WITH FARM BUILDING PLANNING

HOW TO REDUCE BUILDING COSTS

The first requirement of a farm building to become a tool is that it must make money. It must be within the ability of the livestock to pay for it. It must be a sound investment.

Agriculture, being extremely competitive, is basically a business of narrow margins. Livestock and poultry can pay only a limited amount for shelter. The lower the cost the greater the return on the structures. Therefore, sound management demands low-cost structures.

Emphasis now is being placed on buildings that reduce labor. Doane research has shown that low-cost structures can, and most often do, provide labor saving features. Simplest designs usually result in simplest methods of operation.

Doane Low-Cost Pole Construction

Pole frame construction has many labor and material saving features. Any man who can build a chicken coop can construct farm buildings using this simplified method. Apply these Doane developed and tested principles to keep building costs down where livestock can pay for them.

Poles, chemically treated under pressure, are today as far from the old poles our forefathers cut down as the modern tractor is from the horse and walking plow. Pressure treated poles will last 40 to 50 years and often longer than other parts of the building.

Over 25 years of constant research and testing have proven pole frame construction to be both practical and low in cost.

The advantages of pole frame construction can be obtained from (and the principle applied to) almost every farm service building. Advantages are:

1. Lower cost -- cut construction labor in half and reduce material from one-fourth to one-third. Savings of 50 to 60 per cent can be had compared to conventional two-story buildings. For the same type of structure total cost will usually run one-half to three-fourths of conventional construction.

2. Simpler construction -- poles are set the same as fence posts. They take the place of the foundation, framing and bracing in one operation.

3. Faster erection -- no double construction such as building forms and scaffolding because concrete work is eliminated and poles make the structure rigid.

4. Stronger buildings -- poles anchor the building and support the entire framework without bracing.

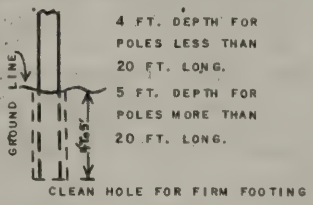
5. Sawing and notching can be greatly reduced -- set poles on odd centers so that standard length material can go direct from the lumber pile into the structure without sawing. Notching is a waste of time, and strength is often lost. Rafters can go into place without sawing or making special cuts.

6. Many items are eliminated -- no excavations for footings and foundation, no anchor bolts or reinforcing, no cement, sand, or gravel, and no all-summer boarding of carpenters.

CONSTRUCTION PROCEDURE

Set Pressure Treated Poles Deep

Add strength by setting poles 4 to 5 feet in the ground. The resistance to turning over increases with the square of the depth. At 2 foot depth the resistance factor is 4; at 5 foot depth it is 25.



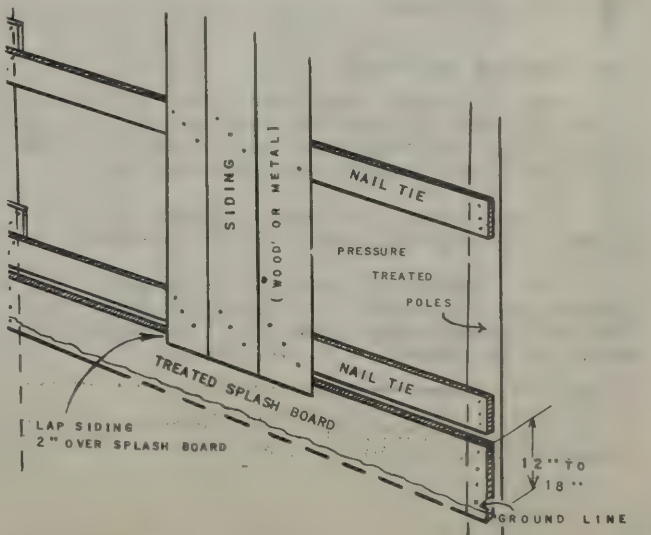
GROUND LINE
4 FT. DEPTH FOR POLES LESS THAN 20 FT. LONG.
5 FT. DEPTH FOR POLES MORE THAN 20 FT. LONG.
4 to 5'
CLEAN HOLE FOR FIRM FOOTING

Do not fill hole with loose dirt if hole is dug too deep. Provide extra length poles (1 to 2 foot) to allow for irregularity in ground elevation.

Place Pressure Treated Splash Boards at Ground Line

Splash boards replace foundation and eliminate forms and leveling of building site.

Let siding extend 2 inches over splash boards. Do not nail together. Extend splash boards at least 12 inches above ground line to protect siding from weathering and rotting.

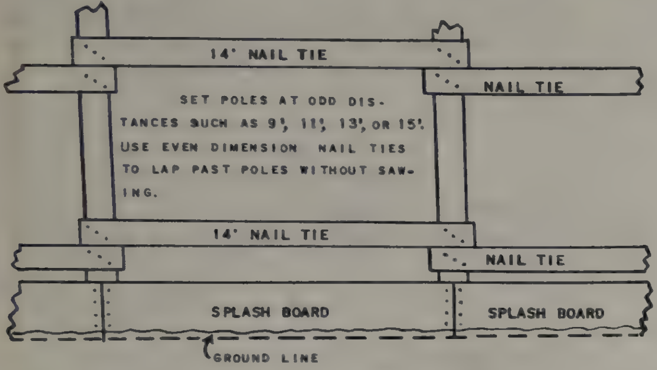


HOW TO REDUCE BUILDING COSTS

CONSTRUCTION PROCEDURE (Continued)

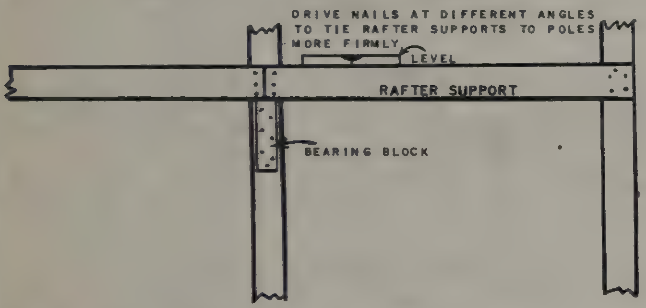
Lap Nail Ties Girts

Eliminate sawing and speed work by taking girts direct from lumber pile and nailing to poles.


14' NAIL TIE
NAIL TIE
SET POLES AT ODD DISTANCES SUCH AS 9', 11', 13', OR 15'. USE EVEN DIMENSION NAIL TIES TO LAP PAST POLES WITHOUT SAWING.
14' NAIL TIE
NAIL TIE
SPLASH BOARD
SPLASH BOARD
GROUND LINE

Nail Rafter Supports Direct to Poles

Eliminate the usual plate and notching. Both are time consuming jobs. Notching often weakens the structure. Simply level rafter supports at plate line and nail in place with 30 or 40 d nails. Bearing blocks, well nailed, may be added where additional support is needed.


DRIVE NAILS AT DIFFERENT ANGLES TO TIE RAFTER SUPPORTS TO POLES MORE FIRMLY
LEVEL
RAFTER SUPPORT
BEARING BLOCK

Use Large Nails and Lag Screws

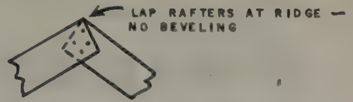
Often the nails used are not large enough to provide greatest strength. Use large spikes (40 d) in place of bolts. Lag screws save construction time over bolts and are often more desirable.

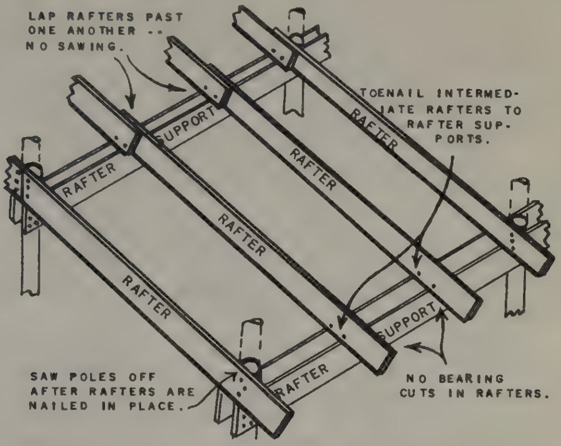
Nail Rafters to Poles

Tie building together and anchor the roof to the ground by nailing rafters to poles. Lap rafters past one another at center spans and toenail to rafter supports.

Do not notch rafters or bevel ends. At ridge, lap together and nail -- no sawing.

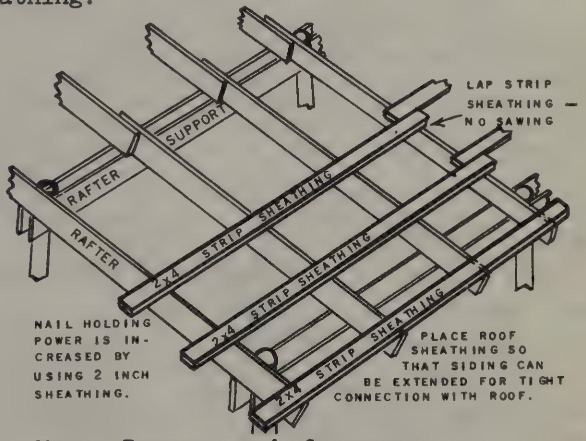
Save lumber in larger buildings by replacing conventional 2 x 6 rafters with 2 x 8 for metal roofs and space 3' 6" on center instead of the usual 2 ft. on center.




LAP RAFTERS PAST ONE ANOTHER -- NO SAWING.
SUPPORT
TOENAIL INTERMEDIATE RAFTERS TO RAFTER SUPPORTS.
RAFTER
RAFTER
RAFTER
RAFTER
RAFTER
SUPPORT
RAFTER
SAW POLES OFF AFTER RAFTERS ARE NAILED IN PLACE.
NO BEARING CUTS IN RAFTERS.

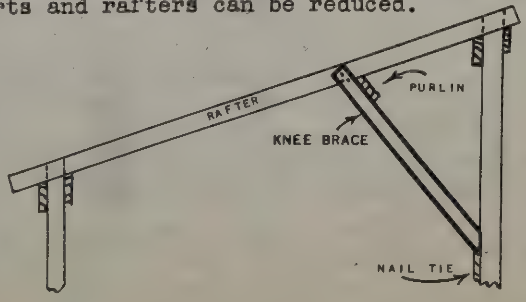
Use 2 inch Strip Sheathing

Replace 1 inch sheathing with 2 x 4's to provide greater nail holding power so metal sheets will not blow off. Whenever it is available, use 2½ inch corrugated metal roofing since it is several times stronger than 1¼ inch corrugations or V-crimp and roof sheathing can be placed further apart. Use 2½ inch nails for 2½ inch corrugated sheets to get good penetration into the 2x4 roof sheathing.


LAP STRIP SHEATHING — NO SAWING
SUPPORT
RAFTER
RAFTER
2x4 STRIP SHEATHING
2x4 STRIP SHEATHING
2x4 STRIP SHEATHING
NAIL HOLDING POWER IS INCREASED BY USING 2 INCH SHEATHING.
PLACE ROOF SHEATHING SO THAT SIDING CAN BE EXTENDED FOR TIGHT CONNECTION WITH ROOF.

Use Knee Braces and Supports

Good knee bracing and supports make longer spans possible. Size of rafter supports and rafters can be reduced.



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LOOSE HOUSING FOR DAIRY HERDS

Dairy cows produce as well in loose housing barns as in conventional stanchion barns. No noticeable difference is caused by cold weather. When cows are used to cold they prefer it to staying inside the barn. They soon adapt themselves by growing heavy coats of hair. Even calves born in the open barns adapt themselves quickly and seem more thrifty than those born in insulated barns or pens.

PRODUCTION AND TEMPERATURE*
By Housing Types

	Conventional Stanchion Barn		Loose Housing System	
	Daily Milk Production	Mean Temperature	Daily Milk Production	Mean Temperature
Year	Lbs.	°F.	Lbs.	°F.
1945-46	36.9	52.8	36.3	39.0
1946-47	35.3	51.4	38.6	38.0
1947-48	37.3	56.4	37.5	34.8
1948-49	38.4	52.3	38.7	37.3
1949-50	40.2	54.0	35.2	36.7
1950-51	31.3	56.7	38.0	29.6
6 Yr. Avg.	36.9	—	37.4	—

* Minimum outside temperature ranged as low as 37°F.

SOURCE: WIS. AG. EXP. STA.

Feed requirements are about the same per pound of milk produced. Cows in loose housing eat a little more in bad weather. Cows show little difference in general health, but those in stanchions suffer more from minor disorders that can cause trouble.

HEALTH DISORDERS THAT MAY BE ASSOCIATED WITH HOUSING*

	Conventional stanchion barn		Loose housing system	
Condition	Number	Serious	Number	Serious
Stiffness or Lameness	23	2	3	0
Foot rot	8	0	5	0
Injured knees and hocks	11	2	0	0
Stepped-on teats	12	4	0	0
Mastitis	44	5	35	1

* These figures cover the 5 year period 1946-50

SOURCE: WIS. AG. EXP. STA.

High quality milk can be produced with both arrangements. Proper location and structure of buildings have little to do with the sanitary quality of milk. A study by the National Research Council, National Academy of Science, states, "Too much emphasis was placed upon size and kind of walkways, construction features of milk house, methods of hay and feed storage, separation of the milk house from the milking barn and similar details which have no proven significance as far as sanitary milk production is concerned."

Loose housing, using pole frame barns, cuts building costs 30 to 50 percent. Building expense accounts for 8 to 14 percent of the gross income from dairy cattle. This is a small amount compared to the cost of feed, management and labor. But the type and arrangement of buildings used can bring down the cost of labor and management. Total labor per cow can be reduced 50 to 60 percent.

START WITH WHAT YOU HAVE

Sooner or later changes will have to come in your building setup if you are to make progress in your dairy operation. You probably can't afford to tear down good, but old fashioned, barns so you must make them work in the new system. However, it is often cheaper to provide new, low-cost sheds than remodel old buildings that have limited capacity.

→ Provide a milk handling and small milking area. You won't be needing the old stanchions so use them to make a 4 or 5 stall milking parlor and use present milking equipment.

Very little extra cost is involved in increasing the herd once the system is in operation, so allow for expansion.

DOANE PHOTO

Loafing Barn

The loafing area is one of the most important parts of the system. Buildings for loafing should have wide open fronts, open traffic lanes and no obstructions such as partitions, posts or pillars. Keep area free of feeding, watering and all cross traffic.

→ Convert existing buildings into open loafing shelters and ground storage for hay and feed.

→ Build a pole frame barn if original buildings aren't enough. With this plan 50 square feet of loafing space per cow may be enough. With average conditions about 70 square feet should be provided.

Use bedding only when needed. No more, and often less, bedding is needed in loose housing arrangements than in stanchion barns. Allow 16 to 20 feet between structures for ventilation and driving through with machinery.

→ Change milking area, as herd increases, to an elevated milking parlor, either to use

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present milking equipment or to be adapted to newer pipeline milkers.

→ Silage feeding facilities should be provided for the best use of roughages. If hand fed provide at least 30 inches of feed bunk space for each animal. If an upright silo is used, a feed bunk can be placed directly under the silo chute.

Large amounts of silage often can be handled by using a single silo. A horizontal trench or bunker silo can be built, convenient to the feeding area, for self-feeding at low cost.

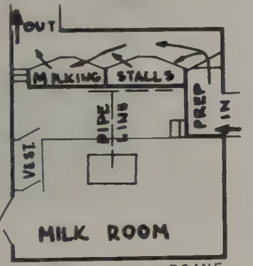
Paved Feeding Areas and lots keep cattle cleaner and make manure easier to handle. One hundred square feet of concrete lot per cow is about right. You can get by with 70-80 square feet if 200-250 square feet of unpaved lot is also provided. Slope pavement away from the feeding area at about 1 inch to every 4 feet.

Holding areas for cows to be milked should be paved. They should be separate from the loafing area. Allow 25 square feet per cow. Avoid locating feeding area near holding area to cut down on manure tracking.

LATEST IDEAS FOR MILKING PARLORS

An efficient milking parlor must be designed to fit the system which is to be used. Most bucket systems are practical in parlors designed for them. Pipeline systems, however, will not give the best efficiency placed in parlors designed for bucket system milking.

A prep-parlor is designed for use with a pipeline system. It will give the top efficiency, with the least equipment for a one man operation. The operator can give proper attention to each cow and each milking unit, without being rushed.



DOANE

Milk room and preparation parlor with prep-stall.

A prep-stall with 2 pipeline stalls is more efficient than 3 pipeline stalls. It will milk more cows per hour, by taking less machine time per cow and having less idle time. By washing the cows in the prep-stall they have time to let milk down and develop udder pressure for a fast milking operation. The result is more milk in less time while the operator is not too rushed to give needed attention.

Parlor milking can cut milking time 50 to 60 percent below that required in a regular stanchion barn. More cows can be handled and the herd increased if desired. By using the loose housing system, even the small dairy farm can efficiently compete with the large producer without increasing his herd.

General Layout

- A loafing area wider than 30 feet will take more labor and more bedding.
- Narrow openings will take more space and utilize bedding less efficiently.
- Structures with one side completely open give better ventilation and cut down on bedding re-

DOANE PHOTO

Loafing Barn and Storage

- Ground storage shortens feeding and bedding chores as much as 2/3.
- A door in the end or back side of the loafing area provides for manure disposal, feed storage and ventilation in warm periods.
- Open shelter eliminates the cost of one wall and provides more use and better ventilation.
- Elevated milking stalls should have a 2 inch curb or ledge next to the operator for the protection of both cow and operator.

Management

Keep young and dry cows separate from the milking cows in herds larger than 15.

Provide a breeding chute to simplify handling and doctoring of animals. Place cows in partitioned areas for freshening.

Add bedding only as needed.

Remove manure from lots and outside paved area as weather permits.

Where ground level permits, scrape manure directly into spreader placed in loading or handling pits.

Use roof gutters over the open side of the barn to carry away water that runs off the roof.

After milking, promptly clean the milking barn. Scrape and remove manure and feed. Follow up by washing or applying ground limestone or other suitable material.

Use an easily cleaned settling tank for waste water and manure where required. A capacity of 20 gallons should be allowed for each cow being milked.

Heating is desirable for the comfort of the operator and for freedom from freezing. Provide the prep-parlor and milk room with an oil or electric heater and thermostat control.

Store bedding along the back wall of the loafing barn. This cuts bedding labor and protects the wall from manure build-up.

☞ When plans for a new milking arrangement are complete, check with local milk authorities to be sure they meet all health requirements.

BUILDING AS TOOLS
FOURTH IN A SERIES DEALING
WITH FARM BUILDING PLANNING

HOW TO BUILD DAIRY BARNS THAT COWS CAN PAY FOR

WHAT CAN A COW PAY FOR BUILDINGS?

The amount a dairy cow can pay for buildings depends mainly upon two factors:

1. Production of Milk
2. Price received

About 10 per cent of the gross income from a dairy cow can be used to pay for the buildings and the annual costs of owning them.

Doane Pole Type Dairy Barn on Lapeer County Press Farm, Michigan

It takes roughly 8 per cent of the original investment to cover taxes, insurance, maintenance, repairs, depreciation, and miscellaneous expenses. Interest on the investment is in addition to this. And, it becomes an added cash cost when money is borrowed.

To determine the amount of money that can be spent for the erection of all dairy improvements, take 10 per cent of the expected gross yearly income, divide by 8 and multiply by 100. The following tables work this out for you.

INCOME FROM DAIRY COWS
How to determine gross income per cow per year

Price Received	Income Per Cow when Yearly Production Is:			
	4,000 Pounds	6,000 Pounds	8,000 Pounds	10,000 Pounds
$2.00	$ 80.00	$120.00	$160.00	$200.00
2.50	100.00	150.00	200.00	250.00
3.00	120.00	180.00	240.00	300.00
3.50	140.00	210.00	280.00	350.00
4.00	160.00	240.00	320.00	400.00
5.00	200.00	300.00	400.00	500.00

DAIRY BUILDING INVESTMENTS
How to figure what you can afford to pay for new dairy buildings

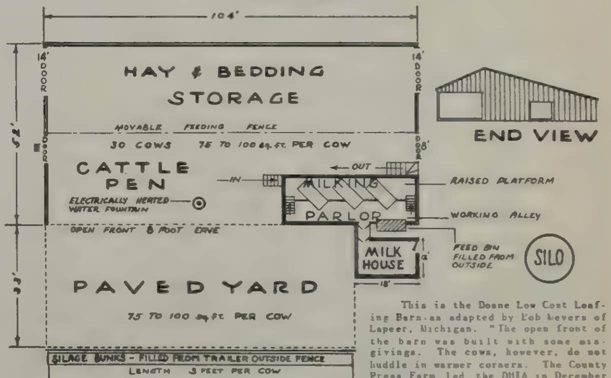
Gross Income Per Cow Per Year*	Amt. Milk Cows can pay for Bldgs. and Facilities			
	Each Cow	10 Cows	20 Cows	40 Cows
$ 50	$ 62.50	$ 625.00	$ 1,250.00	$ 2,500.00
100	125.00	1,250.00	2,500.00	5,000.00
150	187.50	1,875.00	3,750.00	7,500.00
200	250.00	2,500.00	5,000.00	10,000.00
250	375.00	3,750.00	7,500.00	15,000.00
400	500.00	5,000.00	10,000.00	20,000.00
500	625.00	6,250.00	12,500.00	25,000.00
600	750.00	7,500.00	15,000.00	30,000.00

The old stanchion barn is obsolete. It costs too much and the continued expense of extra labor to care for the cows is too great.

DON'T TREAT COWS AS HOSPITAL PATIENTS

Why tie cows up by their heads (put them in bed, so to speak) and be their nursemaid? Why climb into mows, lug hay to hay chutes, poke it down and then have to distribute it? Why spend money to pipe water and serve it to each individual "Bossy" in a special cup? Why should you carry bedding to each cow and haul out manure each day. Why continue to lug milking utensils, wash buckets, and strip cup to and from the cow, to say nothing of carrying away the milk? These are important questions to ask when planning new dairy facilities.

FLOOR PLAN



This is the Doane Low Cost Loafing Barn as adapted by Bob Bevers of Lapeer, Michigan. "The open front of the barn was built with some misgivings. The cows, however, do not huddle in warmer corners. The County Press Farm led the DHIA in December with 38.3 lbs. of butterfat. The record came as a surprise for the cows had been moved to the new barn only two days before the tester came. A day before the cows were tested, the thermometer dropped to zero."

"Grandpa methods" should be discarded. Work in and around the dairy can be greatly reduced by letting the cows work for you. Cows like to walk to the hay, to the watering tank and to the silage feed bunk. And, they will gladly wait in line to get into the milking parlor when grain is fed at milking time.

BUILD A LOAFING BARN -- SAVE WORK

It is just as important to have buildings that reduce work as it is to have buildings that the cows can pay for. Here are some of the essentials.

1. Open to the South -- Leave the whole south side of the barn off. This cuts costs and allows free movement of air, so you can forget about ventilation problems. You have

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HOW TO BUILD DAIRY BARNS THAT COWS CAN PAY FOR

healthier cows and less fluctuation in milk flow when the inside temperature of the barn is close to the temperature outside. (Yes! Even in northern climates).

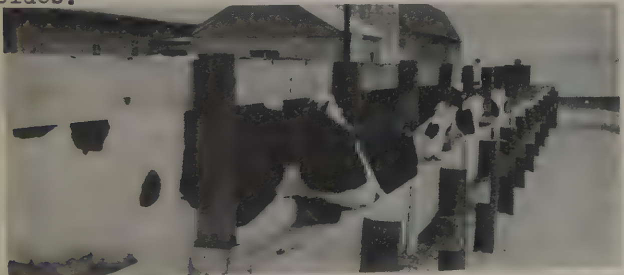
2. Hay and Bedding Storage Where Used -- Store roughage (preferably at ground level) where the hay can be rolled to a feeding fence and bedding tossed out into the loafing area. The cows will stay cleaner if hay and silage can be fed outside away from the loafing area. Where bedding is short this is essential for a loafing barn arrangement.

3. Unobstructed Interiors -- Construct the loafing and hay storage area with as little obstruction as possible. Where pole frame construction is used, poles should be spaced at maximum distances. Arch-type roofs are ideal for loafing barns.

4. Floor Area Per Cow -- Provide 100 square feet per cow. It is possible to get by with slightly less area for Jerseys and other small breeds. About half the floor area is needed for the holding pen to confine the cows while waiting their turn in the milking parlor.

5. Surfaced Lots -- A well drained lot of 100 square feet per cow should be provided adjacent to the open south side of the barn. In most cases, it is desirable to surface this lot with a 4-inch slab of concrete.

6. Feed Bunks -- Provide a "feeding fence" along the outside of the lot, so silage may be fed without having to drive into the lot. With small herds, carriers on tracks or carts may be used to distribute silage from silo to feed bunk. An alternate is to connect feed bunks to the silo and run them out in the lot so cows can eat from both sides.



SILAGE FEEDING FENCE

MILKING PARLORS WITH HIGH EFFICIENCY

Anyone building a milking parlor these days should give careful consideration to the milking arrangement whether using pipe line or pail type milkers. A modern 2 or 3-cow milking parlor is adequate for any herd up to 40 cows. One man can put 20 cows per hour through such a unit, and not work too hard doing it.

Some of the essentials of a good milking parlor and milk house (or milk room) are:

1. "In" and "out" doors for the cows should be operated from the milking area.

2. Walking distance for the cows in the parlor should be short -- the shorter the distance, the fewer the droppings.

3. Time of the cows in the milking parlor should be short -- preferably not more than 7 minutes. In two-cow parlors where milking time averages about 5 minutes, cows can eat up to 7 pounds of feed. Often there are no droppings in the milking parlor for several weeks.

MOVABLE HAY FEEDING FENCE - GROUND LEVEL STORAGE

4. Walking distance for the man should be as short as possible to save work. Center the passage from the milking parlor into the milk room to reduce steps.

5. Milking pits are very desirable. The operator should stand 28 to 30 inches below the level of the cows.

6. Sanitary milk production should be part of the regular routine without extra work. Make it easy to wash udders with a clean cloth, use strip cups, and rinse and disinfect teat cups after each cow is milked.

7. Comfort of the operator and freedom from freezing is essential. Provide an oil heater or an electric heater with thermostatic control. Insulate both milk room (house) and milking parlor. In areas where temperatures seldom go below zero, several infra-red 250-watt electric heat lamps directed on the operator will give excellent results.

8. Hot water for sterilization of utensils should be in abundance. Household hot water heaters are most satisfactory.

9. Floor area of the milk house should be large enough to meet code requirements. A good formula for figuring the proper size is:

(a) Take 108 sq. ft. as a base.

(b) Add 6 sq. ft. for each 10-gallon can of milk produced per day during the season of highest production.

10. Window openings for both the milk room and milking parlor should be 10 per cent of the floor area to meet code requirements.

☞ When you have completed your plans for a new milking arrangement, be sure to check them with the local milk control board to be sure they meet all requirements.

BUILDINGS AS TOOLS
FIFTH IN A SERIES DEALING
WITH FARM BUILDING PLANNING

THE FOUR-SEASON HOG HOUSE --
A MONEY MAKING TOOL

Hogs should be expected to pay for the buildings they use. But it is up to you to keep building costs in line with the "house rent" that a sow can afford.

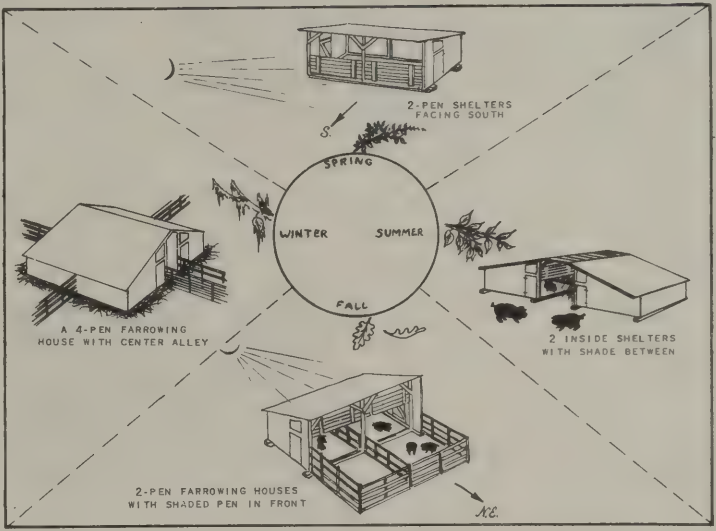
WHAT CAN HOGS PAY FOR BUILDINGS?

→ The maximum rent a sow can afford to pay for buildings is equal to 6 per cent of the gross value of her pigs at weaning time.

→ The maximum you can afford to spend for new buildings is equal to 11 times this annual rent.

Under a two-litter system, a good hog raiser might wean 16 pigs per sow in one year. A pig at weaning is now worth at least $8. Thus the annual gross income per sow would be $128 and she could pay $7.68 (6 per cent of $128) in rent for buildings. You could invest $85 per sow for buildings ($7.68 x 11) or $340 in a 4-sow house like the one shown on this page. These figures are for buildings to house the breeding herd and the pigs until weaning time.

The tables below will help determine what your hogs can pay for buildings.


2-PEN SHELTERS FACING SOUTH
S.
SPRING
WINTER
SUMMER
FALL
A 4-PEN FARROWING HOUSE WITH CENTER ALLEY
2 INSIDE SHELTERS WITH SHADE BETWEEN
2-PEN FARROWING HOUSES WITH SHADED PEN IN FRONT
N.E.

CENTRAL VS. PORTABLE HOG HOUSES

Years ago, the central hog house was "just the ticket". The central alleyway with pens on each side made it easy to care for sows and pigs. But, parasites and diseases soon infected the lots around the central house. A farmer could save large litters, but they would make slow gains and feeding worms was expensive business.

The "McLean County" system was developed to get hogs on clean ground. When the sows farrow on clean pasture, disease losses are mostly eliminated. However, distance to the field is often so far that sows and pigs can easily be neglected, especially at farrowing time. Sometimes pigs are farrowed in the central house and then moved to clean pasture when several weeks old. This program requires duplicate facilities. Building costs are too high these days for such a wasteful investment. The large central hog house stands idle most of the year.

TABLE I

HOW TO DETERMINE THE VALUE OF PIGS WEANED PER SOW PER YEAR

Select the average number of pigs weaned per sow per litter and the average value of one pig at weaning. Follow the columns to where they meet, to determine the value of pigs sold per sow per litter.

When 2 litters are raised, double these figures. Carry figures to table II

No. of Pigs Weaned Per Litter	Average Value Of One Pig At Weaning								
	$4	$5	$6	$7	$8	$9	$10	$11	$12
5	$20	$25	$30	$35	$40	$45	$50	$55	$60
6	24	30	36	42	48	54	60	66	72
7	28	35	42	49	56	63	70	77	84
8	32	40	48	56	64	72	80	88	96
9	36	45	54	63	72	81	90	99	108
10	40	50	60	70	80	90	100	110	120

THE MULTI-USE HOG HOUSE --
A WORKING TOOL THE YEAR AROUND

To make hog farming profitable and reduce building costs to a minimum, Doane farm managers have designed a 2-section 4-sow hog house for use 365 days a year.

Late Winter and Early Spring -- The two sections are pulled together for early farrowing. Removable floor panels are put in place on top of the runners. Straw or dirt is banked around the house to keep out cold drafts. It can be moved close to the farmstead or left in the field.

Spring -- The floor panels can be removed. The 2 sections are separated and faced south to give plenty of fresh air and sunshine. At weaning time, some sections are moved to clean clover and others to brood sow pasture.

Summer -- The two sections are placed with ridges 8 to 12 feet apart. The floor sections, or poles covered with straw can be placed across the ridges to provide shade as shown in center picture. Some operators block up the eave side runners so air can flow under the entire house.

Fall -- After spring shoats are sent to market or dry lot, the houses are moved to clean ground for fall farrowing. The sections are faced northeast so shade from roof ridge will extend over the two individual pens in front.

As weather gets cooler, the sections can be turned again to face south. When severe cold weather comes, the two sections can be pulled together again into one house.

ADVANTAGES OF DOANE MULTI-USE HOG HOUSE:

- Low cost when year around use is considered.
- Fewer buildings to move.
- Easily cleaned -- saves labor.
- Combines advantages of both individual and central-type hog houses.
- Can be moved through 12' gate.
- Can be used for other farm enterprises.

TABLE II

HOW TO CONVERT GROSS INCOME PER SOW
TO RENT AND COST OF BUILDINGS

Value of Weaned Pigs Per Sow Per Year (use nearest figure)	Rent One Sow Can Pay (6% of income)	Value of Building You Can Afford*
$ 60.00	$ 3.60	$ 39.60
70.00	4.20	46.20
80.00	4.80	52.80
90.00	5.40	59.40
100.00	6.00	66.00
120.00	7.20	79.20
140.00	8.40	92.40
160.00	9.60	105.60
180.00	10.80	118.80
200.00	12.00	132.00

* Based on 9% for depreciation, taxes, insurance, and maintenance.

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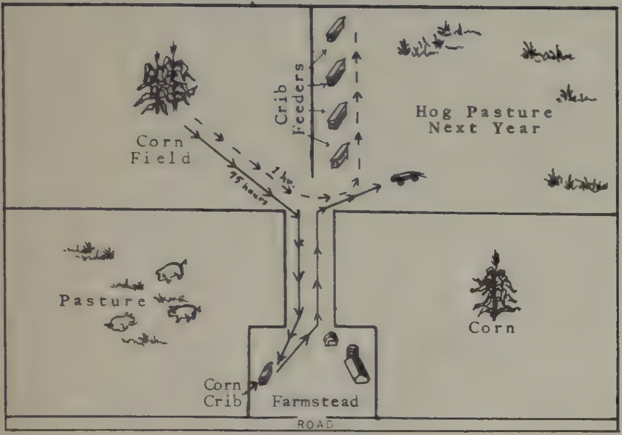
LABOR SAVING HOG EQUIPMENT

Highest profits from hog raising are made when labor costs are kept to a minimum. If you're doing all the work alone, your wages will be higher when more hogs are raised.

A Crib-Feeder will cut out 90 per cent of the work of feeding corn to hogs. Where about 75 hours are required to haul corn from the field to the crib and back out to the field, only one hour is needed when crib feeders are used.



75 Hours The Old Way
1 Hour With Crib Feeders

Crib feeders have been successfully used on Doane managed farms. Holding about 450 bushels of ear corn, one crib feeder is needed for each 40 pigs fed to market weight. These feeders can be moved to new locations when empty.

The Doane Portable Hog Feeder always works without a lot of adjustment or monkey business. It handles 160 hogs when used for protein supplement, or 80 shoats when feeding shelled corn or ground feed.

Farmers like it because:

- It doesn't waste feed.
- It's weatherproof.
- Cattle and horses can't eat out of it.
- Reasonable cost considering the 100 bushel capacity.
- Simple design makes it easy to build yourself. You need about 900 board feet of lumber and about 30 hours to build it

Doane Portable Hog Feeder

The Doane Ear Corn Feeder, pictured on P. 226 lets the hogs shell their own corn without waste of valuable feed. The opening below the railing is just right to allow the cobs to slip through. The cobs are left in the field where you don't have to haul them away.

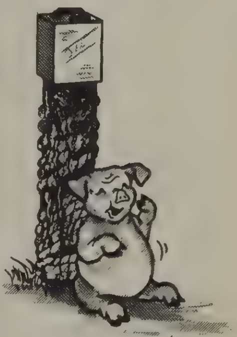
A Good Hog Loading Chute will save money by preventing bruises and injuries when loading for market. The chute should be at least 12 ft. long so that the hogs will move up the chute without being hammered. A chute not more than 28 inches wide will prevent the hogs from turning. It can be moved easily if equipped with wheels.

Plenty Of Water is essential to profitable hog gains. Water piped into an automatic fountain from the farmstead or nearby well is best if arrangements can be made. If water hauling is necessary, you can save time by using a large tank with built-in fountain as shown below.

Portable Hog Waterer

Sows need 5 to 8 gallons of water daily; fattening hogs, 1-1/2 to 3; and pigs under 100 lbs., 1/2 to 1-1/2.

Combination Back Scratcher-Oiler will also help save wear and tear on fences, gates, and buildings. A round, straight post is set firmly in the ground. An old hay rope or burlap bags are wrapped tightly and fastened securely around the post from the ground up to about 30 inches. A large tin can is set on top of the rope by cutting a hole in the bottom just big enough to fit over the post. Used motor oil is poured in the can. It will run down onto the rope and provide a place for hogs to rub and oil themselves.



Combination Hog Oiler
And Back Scratcher

* * *

The buildings and equipment described on this sheet are designed for practical use on farms where hogs are raised as a major enterprise. They have been tested and proved workable under actual farm conditions. Should you desire further information about blueprints for any of these items, it is available through our offices.

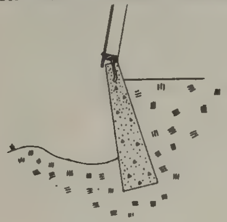
FARM BUILDING REPAIR

FOUNDATION FAILURE AND REPAIR

In construction or repair of foundations the following practices will pay large dividends in the long run.

1. Use not to exceed 6 gallons of water per sack of cement in making concrete for foundations.
2. Use only clean materials.
3. Reinforce foundation walls near top of walls and around the corners.
4. Use forms on both sides of the wall for best results.
5. Place foundation wall on a broad footing. (A width of 12 to 16 inches is usually sufficient).
6. Set bolts in concrete to hold the sills in place.
7. Provide good drainage for roof water.
8. Place footing below frost line.

Foundation Wall Tilted Out.—In the first drawing below is shown a common type of foundation failure. Proper care of the roof drainage would probably have prevented it. Wet soil has about one-half the strength of dry soil.

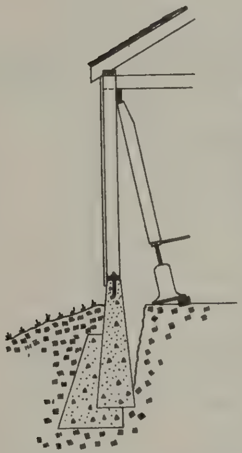


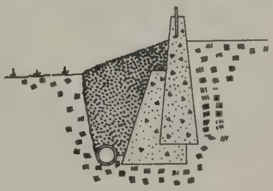
Causes of Failure

1. Soil beside and under the foundations failed.
2. Pressure was developed inside of foundation wall.
3. Livestock may have crowded against the wall.
4. Footing was too small.

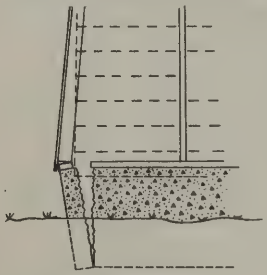
Steps in Repairing

1. Jack up one section of the building at a time. Raise a little higher than the normal position.
2. Straighten foundation wall and pour footing as shown.
3. Allow time for curing and then lower the section into place.
4. Provide spouting or grade up around building to secure drainage.
5. A tile drain covered with gravel may be used in lieu of spouting.





Foundation Split at Corner.—Concrete is ten times stronger in compression than it is in tension. By casting steel rods in the concrete when it is made, this weakness is overcome.

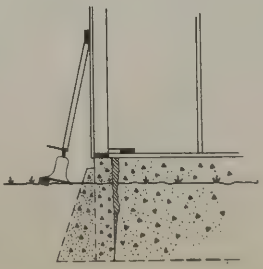


Causes of Failure

1. Pressure on inside of both walls causes extra load on foundation at corner.
2. Lack of reinforcement at corners.
3. Excess water outside the foundation at corner.

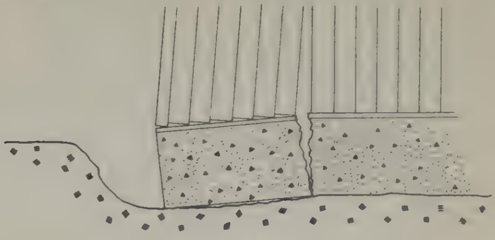
Steps in Repairing

1. Chip away about 2 inches of the wall at break to allow end foundation to come back into place.
2. Jack wall and foundation back into correct place.
3. Build pilaster to hold wall in place.
4. Nail tie across corner to hold sills in place.
5. Fill opening in wall.



MISSOURI AGRICULTURAL EXPERIMENT STATION

Foundation Undermined—Lack of care of roof drainage is the cause of many failures in farm buildings. Spouting connected with surface gutters of concrete will remove this water safely.

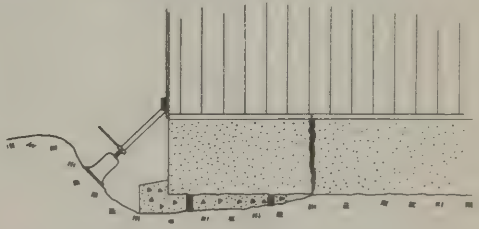


Causes of Failure

1. Erosion or a hog wallow caused by lack of drainage.
2. Lack of support under footing at corner.
3. Lack of reinforcement in the top of the wall.

Steps in Repairing

1. Dig under foundation at one point to provide room for jack.
2. Chip off about 2 inches of the wall at the break to aid in getting it back into place.
3. Lift foundation and building back into place.
4. Support on brick pillars as shown.
5. Pour a concrete footing, tamping it well under the old wall.



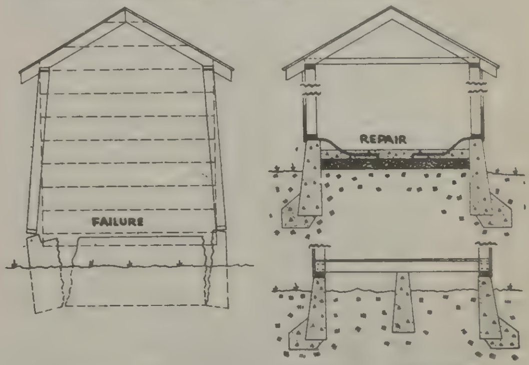
If a foundation is undermined between supports, the reinforcement is needed in the footing or at the bottom of the beam.

New foundations should be reinforced near the top, the bottom, and around the corners to be safe for all conditions.

Spreading of Walls—Either wood or concrete

Causes of Failure

1. Pressure of grain.
2. Lack of adequate cross ties.
3. Lack of reinforcement in foundation and floor.
4. Burrowing rodents.
5. Moisture in grain keeps lumber damp.
6. Livestock damage lumber attempting to get to grain.



Repairing with Concrete Floor on Gravel or Cinder Fill*

1. Jack up one side of building and straighten.
2. Put foundation back in correct position.
3. Grout in a footing to hold foundation in place.
4. Repeat for opposite side.
5. Break out section of floor to hold anchors (spaced 6 feet).
6. Repair floor and cast anchors in place.
7. Renail siding as needed.

Steps in Repairing (Wood floor on concrete walls)

1. Jack up one side of building and straighten.
2. Put foundation back in correct position.
3. Grout in a footing to hold foundation in place.
4. Repeat for opposite side.

---

*If cinders are used it may be advisable to place roofing paper under the cinders.

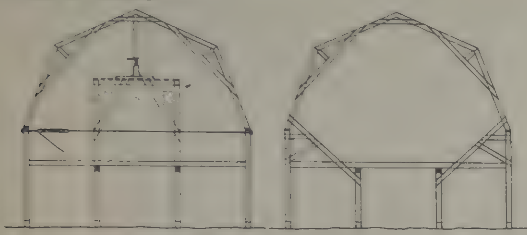
FARM BUILDING REPAIR

ROOFING FAILURES

Sagging Roof.—This is another type of failure that grows rapidly worse unless promptly repaired.

Causes of Failure

1. Pressure of hay on frame on sidewalls.
2. Lack of stiffness in plate.
3. Incorrect bracing.

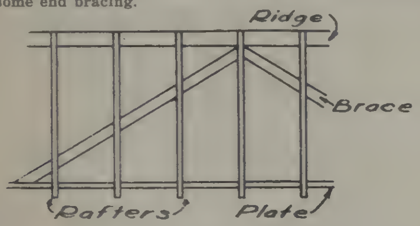


Steps in Repairing

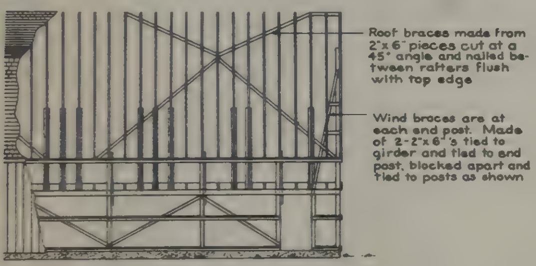
1. Build up a platform from which to lift at center.
2. Attach a cable and block to pull side walls in at the plate level.
3. Apply both at the same time to straighten roof line.
4. Install side braces made of two 2" x 8"s at intervals of 8, 10, or 12 feet.
5. Renail all braces affected

BRACING THE ROOF ABOVE THE PLATE

Steep roofs extend to a considerable height above the plate and require some end bracing.



A 1" x 6" board nailed under the rafters may be used on a straight gable roof.

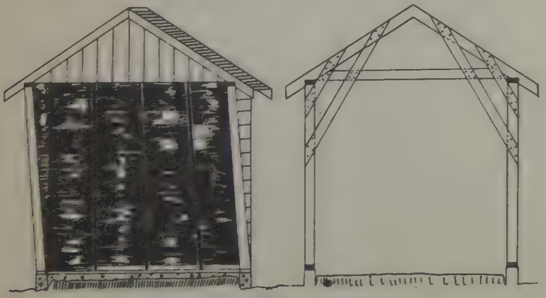

Roof braces made from 2"x6" pieces cut at a 45° angle and nailed between rafters flush with top edge
Wind braces are at each end post. Made of 2-2"x6"'s tied to girder and tied to end post, blocked apart and tied to posts as shown

2" x 4" pieces nailed in between rafters as shown is used on roofs with obstructions on under side as in the gambrel roof.

FAILURE IN BRACING

Causes of Failures

1. Doors are open a great deal and wind causes a strain .
2. There is no width of wall to give stability.
3. Weight of doors causes strain.



Single Garage Without Bracing

Bracing Inside the Building

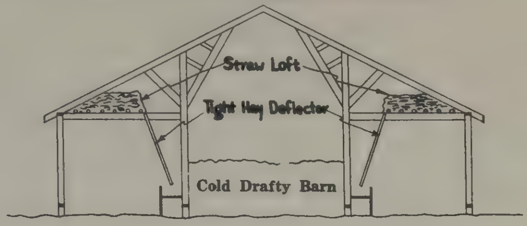
Steps in Repairing

1. Straighten building until sides are plumb.
2. Nail short tie to hold rafter on plate.
3. Nail brace to rafter, joist and studding. Set brace as far down as possible without interfering with use of door.
4. Nail and brace across rear end if needed.

FAILURE IN VENTILATION

Causes of Failure

1. Heat produced by stock is dissipated into hay storage space.
2. If shed doors are open, drafts through the entire building are sure to result.
3. No checks or barriers to air movement are provided.



How to Repair Ventilation Failure

1. Build solid deflector over mangers.
2. Place poles one foot apart on ceiling ties.
3. Cover poles with chicken netting and straw.
4. Add extra hay or straw to mangers on extremely cold, windy nights to prevent drafts.

Hay can still be fed direct to mangers but cross drafts will be checked. Air movement through straw loft will give adequate ventilation.

PAINTING FARM BUILDINGS

Paint when properly selected and applied lengthens the serviceable life of buildings as much as 40%. An investment in paint brings an annual return of about 3¼% through saving in buildings alone.

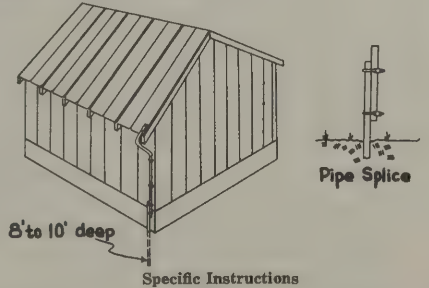
A Good Paint Job Depends On:

1. *The Paint.* Good quality suited to the job.
   - Pigment—60 to 65% by weight.
   - Vehicle—40 to 35% by weight.
2. *The Surface* to be painted.
   - a. Wood should be dry and clean.
   - b. Knots should be treated with
     - (1) Shellac.
     - (2) Aluminum primer.
     - (3) Furfural.
3. *The Painter.*
   - a. Paint must be mixed thoroughly before using.
   - b. Paint must be selected and applied as per specifications of manufacturer.
   - c. Paint must be brushed to secure thorough spreading and intimate contact.
4. *The Weather.*
   - a. Surface should be dry.

LIGHTNING PROTECTION FOR METAL ROOFS

General Information

1. A metal roof should be grounded for safety.
2. Ground opposite corners of the roof. If building is over 200 feet in circumference, ground four corners.
3. Renew ground pipe if rusted.



Specific Instructions

1. Flatten ½ inch pipe so as to secure 3 square inches of contact with metal roof.
2. Drill to take bolts for fastening to roof.
3. Bend to fit against building as shown. Avoid sharp turns.
4. Drive or set ground pipe deep enough to reach moist soil. If rock is encountered, lay in a horizontal trench.
5. Splice to upper pipe with clamps or "U" bolts.
6. Cupolas or raised parts on roof should have points. These can be grounded to the metal roof.

FARM FENCES —
A PRODUCTION TOOL

Sturdy, well-built fences have become a necessity on modern farms. Well kept fences:

- Maintain farm boundaries.
- Make livestock operations possible.
- Increase land values.
- Protect crops from livestock.

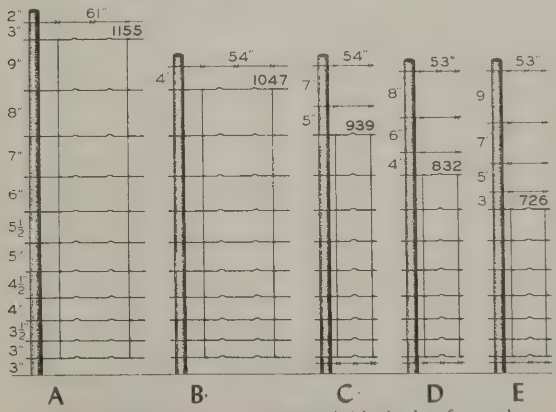
SELECTING MATERIALS

Woven And Barbed fences have proved most practical for farm use. The kind and amount of coating on the wire definitely affects its lasting qualities. Fence coated with 1.7 ounces of zinc per square foot showed no rusting in a 12 year test at Purdue University. Fence with only .6 ounce coating rusted over 100 per cent of its area.

Good Fences -- An Asset To Any Farm

Woven wire is made in standard sizes of 26, 32, 39, 47 and 55 inches. The lower heights are more commonly used for temporary fences. Stay wires (the vertical wires to keep horizontal wires evenly spaced may be either 6 or 12 inches apart. The 6 inch stays are best for hogs -- wider spacing is all right for sheep, cattle, and horses.

Wire fence is sold in 20 and 40 rod rolls -- 9 to 14 gauge. ☞ Heavier 9 gauge fencing is usually the best investment especially for cattle. It will pay for its higher cost through longer service. Eleven gauge will also give good service. Special fences for poultry range from 35 to 72 inches high, 4 or 6 inch stays, and 13 to 17 gauge.



Fence standards combined with recommended barb wire for good construction: A - 55 inch fence, 11 bars, 12 inch stays, 1 barb. B - 47 inch fence, C - 39 inch fence 6 in. stays. D - 32 inch fence. 3 - 26 in. fence. C, D, E, bottom line barbed wire for hogs.
USDA Bulletin, 1832

Barbed wire is sold in 80 rod spools -- usually 12½ or 14 gauge. Two point barbs are placed 4 inches apart -- four point barbs 5 inches apart.

Posts may be either steel, wood or concrete. Steel fence posts can be driven rapidly, and have long life. The T cross-section will resist shock from all directions. Galvanized posts last longer and cost only a few cents more.

When wood posts are used, be sure to select a durable type. ☞ The life of your fence depends on the life of its posts!

AVERAGE LIFE OF UNTREATED FENCE POSTS

Wood	Years	Treatment
Native Juniper	30-40	1
Osage Orange (hedge)	30	1
Black Locust	25	1
Red Cedar	20	2***
Arbor Vitae (Northern White Cedar)	15-20	3***
Catalpa	15-20	2**
Burr Oak	15	2**
White Oak	11	2**
Cherry	10	3*
Red Elm	10	3**
Honey Locust	8-10	2***
Mulberry	8-10	2***
Sassafras	8-10	3***
Douglas Fir	6-10	4***
Green Ash	3-10	4**
Red Oak	7	4*
Willow	6	4**
Pine (Yellow, Jack, Red, Lodge Pole, Ponderosa)	4-8	4*
Cottonwood	2-6	4***
Aspen	2-6	4**

Treatments --
1. Does not need treating.
2. Treat small round posts -- Do not treat split or large round posts.
3. Improved by treatment.
4. Use only if treated.

Results From Treatment --
* Select these posts for treatment when possible.
** Fair or poor results -- use only if "good" species can't be found.
***Results of treatment not yet tested.

The life of wooden posts can be greatly improved by treating with a chemical preservative. The most effective are: creosote, pentachlorophenol, zinc chloride, and chromated zinc chloride. Creosote and "penta" are used only on dry seasoned posts. The others are most effective for green posts with bark left on.

Creosote has been used successfully for many years. It stays in the wood and is highly effective against rot and insects. Tests on creosoted posts treated by the hot-cold bath show an average life of 30-35 years. Pressure-treated posts now on the market will last even longer. When not treated these same posts would last less than ten years.

Pentachlorophenol or "Penta" has been widely used in recent years. It is more toxic than creosote, but easier for a farmer to use. The posts can be painted after treatment. They will last at least 25 years.

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FARM FENCE CONSTRUCTION

Zinc Chloride or chromated zinc chloride treatment will not give as durable posts as the other treatments but it is simple, inexpensive, and is much better than no treatment at all.

"If you treat a nondurable wood which takes treatment easily, you will probably have a more serviceable post than if you use a naturally durable wood without treatment." -- Illinois Circular 636.

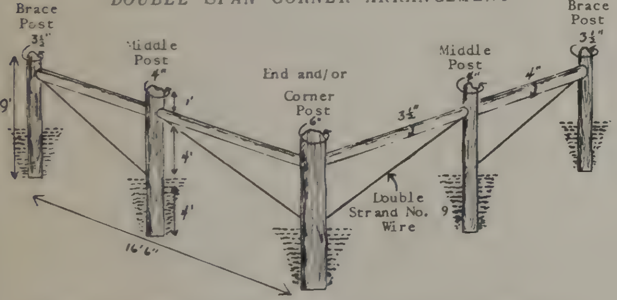
BUILDING THE FENCE

Sturdy posts and sound end braces make the difference between good and poor fences.

By following a few simple rules, you can build a secure, long-lasting fence:

→ **Set End Or Corner Posts** so they will not give or lift. They are the foundation of the fence. In tests at Iowa State College some form of a double span was the most satisfactory end and corner arrangement. The double span is cheap, simple, and takes less time and labor to set than the single span with necessary anchoring. The end and corner structure of your fence must be solid enough to resist frost heaving and loads produced by stretching of the wire, temperature changes, and livestock.

DOUBLE SPAN CORNER ARRANGEMENT

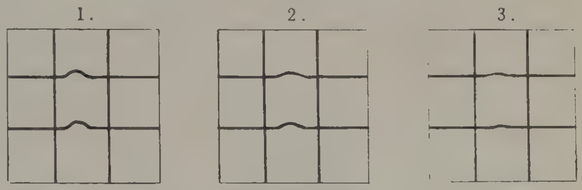


Diameter of posts and braces are the minimum recommendation of the Farm Fencing Association.

→ **Spacing** between line posts will vary with different types of fence -- usually 12 to 16 feet. Remember that line posts are intended only to hold the fence up and keep it in place. When crossing ravines or depressions, anchor posts into the ground or drive extra steel posts 3½ to 4 feet deep to hold the fence to the ground. If steel posts are used, unroll the fence so it will lie against the face of the posts.

→ **Stretching The Fence** -- Pull the tension curves to about one-half their normal size. These "springs" of the fence expand and contract as temperatures change and when the fence gets a hard blow. Over-stretching injures the fence. Set the fence against the line posts before the full stretching strain is applied. Never stretch around a corner post.

STRETCH FENCE PROPERLY



1. Normal tension curves before stretching. 2. Tension curves properly stretched to 1/2 normal. 3. Tension curves stretched too far.

→ **Staples** should be driven diagonally with the grain and not clear in. The fence needs some freedom to stretch and shrink. Set line posts at least 2½ feet deep -- 3½ is better. Ground the fence so that lightning striking it will not harm livestock.

Electric Fences provide low investment, maintenance, and operating cost. They can be used for temporary fences, and to extend life of permanent fences. Barbed wire helps make good contact but smooth wire can be used satisfactorily.

For cattle and horses, use one wire about 30-40 inches high. For hogs, use two wires at heights of 6 to 8 and 16 to 18 inches above the ground. Use two wires for sheep. Porcelain or glass insulators are needed at each post. One lead from the controller should be grounded to a pipe driven into moist earth. ☞ Do not ground an electric fence to a water pipe! It could carry lightning directly to your buildings. Install lightning arrestor on the ground wire. Fence controllers should be purchased from a reliable manufacturer. Home-made controllers can be dangerous!

COSTS OF FENCE CONSTRUCTION

Fence costs vary widely with types of construction and changing prices of materials and labor. Wire, posts, and labor are the largest costs. Our farm managers now estimate cost of materials alone at $2.50 per rod for a 39 inch woven wire fence, with 2 barbs and 1 post per rod.

Annual Cost of Fence Posts Based upon Initial Cost of Set Posts and Serviceable Life

Cost of set posts*	Annual cost of fence posts when life of posts in years is:								
	3	5	7	9	12	16	20	25	30
dollars					cents				
0.40	0.13	0.08	0.06	0.04	0.03	0.02	0.02	0.02	0.01
.50	.17	.10	.07	.06	.04	.03	.02	.02	.02
.60	.20	.12	.09	.07	.05	.04	.03	.02	.02
.70	.23	.14	.10	.08	.06	.04	.04	.03	.02
.80	.27	.16	.11	.09	.07	.05	.04	.03	.03
.90	.30	.18	.13	.10	.08	.06	.04	.04	.03
1.00	.33	.20	.14	.11	.08	.06	.05	.04	.03
1.10	.37	.22	.16	.12	.09	.07	.06	.04	.04
1.20	.40	.24	.17	.13	.10	.08	.06	.05	.04
1.30	.43	.26	.19	.14	.11	.08	.06	.05	.04

* To be computed by user, depending upon cost of posts, labor, and equipment required for setting.

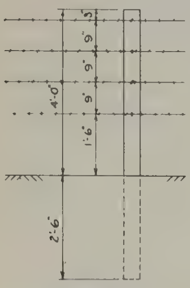
Univ. of Minn.

Farmers who raise their own posts can save money. The table shows that annual costs of posts depends just as much on the life of the post as the original cost.

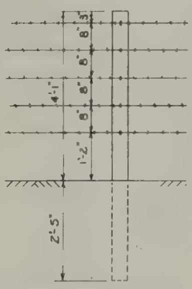
FENCING FOR CATTLE

"Good equipment makes a good farm or ranch better" is true of ranch fencing. Poor fences are the best way to make "breachy" stock.

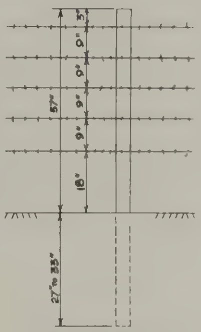
Barb Wire Fences are the most practical for large pasture enclosures for cattle. They are cheaper to build than woven wire or wooden fences. Spacing wires so cattle seldom get their heads through the fence is more important than over-all height.



Four Wire Fence



Five Wire Fence



Five Wire Fence

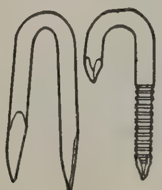
Five wire fences should have 8 inch spaces if all ages of cattle are to be held -- 9 inch spaces, higher on the posts, for pasturing aged steers or when used for working cattle.

American Hereford Assn.

A Barb Wire Gate with built-in stays of twisted barb wire will not tangle when opened. Line wires for the gate should be fastened to sticks at each end. Gate stick loops at both ends will make gate last years longer.

American Hereford Assn.

L-Shaped Staple increases in holding power the longer it is in use. Threads on the new staple may give it up to 80% more holding power than conventional two-prong staples.



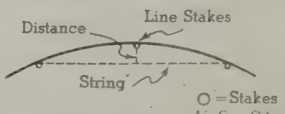
Its shape makes it easier to use. Just start the staple with a hammer, then hang the wire over it and drive it the rest of the way in. It isn't necessary to hold staple and wire at the same time while driving.

Cattle Guards for easy access to pasture and yards by cars and trucks, should be 10 feet wide and 8 feet across. An extra gate at one side of the guard should always be provided for livestock and heavy loads.

CONTOUR FENCING

Building successful fences on a contour is easier than building a straight fence over uneven ground. A few simple guides should be followed:

Stake out a smooth curve along the contour with stakes spaced one rod apart. Stretch a string between the first and third stakes in any fence section. Measure the distance from the string to the center stake. Repeat this operation wherever the curvature changes noticeably.



U.S. Steel

Set posts at recommended intervals for the fence curvature. Check by eye to be sure posts form a smooth curve.

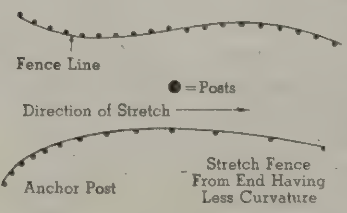
RECOMMENDED POST SPACINGS

Distance from the Center Stake to String, Inches	Recommended Post Spacing, Feet
4 or less	16½
4-5	15
5-6	14
6-8	12
8-14	10
14-20	8

EXAMPLE: If the distance from the center stake to the string measures 5½ inches, the line posts should be placed 14 feet apart. If the distance were 10 inches, the post spacing would be 10 feet, etc.

U.S. Steel

Set post tops out about two inches on contour fences. Stretching the wire will tend to straighten them to a plumb position. Always put the wire on the outside of posts on the curve.



U.S. Steel

Stretch a contour fence about half as tight as a straight wire fence. The sharper the curve, the less tension should be applied and the shorter stretch span may be necessary. Go along the fence several times while stretching

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it, releasing it where barbs catch the posts. Stretch from least-curved fence end.

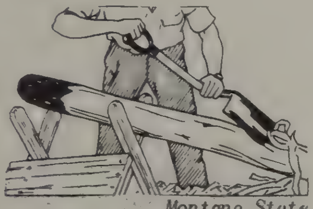
POST TREATING

Cold-soak method can go on without interrupting other jobs. Will save as much as $1 per post for non-durable wood. Equipment needed:

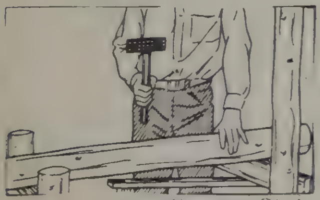
√ Leak-proof tank or 55 gallon drum.
√ Supply of chemical (Pentachlorophenol).
√ Oil to serve as carrier for preservative.

Use wood species that will take treatment best, if several are available (see page 341). To take good treatment, posts must be well-seasoned and free from outer and inner bark.

CUT POSTS at any season, but remove bark as soon as possible. Peeling is easiest when sap is up -- usually in spring or early summer. A sharpened spade makes a good tool for peeling round timbers.


Montana State

PEELED POSTS will be sufficiently seasoned after two months of summer weather if they are parallel-piled. Too fast seasoning causes a glazed surface condition which closes the wood pores and prevents successful treating. The glaze can be broken by using an incising hammer or by allowing the posts to weather a year or two longer.


Montana State

An incising hammer can be made by welding 1/2 inch long spikes 3/4 of an inch apart on a flat piece of iron with a handle attached.

INCISE POSTS in a band six inches above and below the ground line area. Better penetration of preservative will also result for wood species not adapted to cold-soak treatment, if posts are incised.

Bury the treating barrel about half way to make filling and removing posts easier. Mix 50% penta concentrate with diesel fuel or low grade stove oil -- 1 gallon of penta to 10 gallons of oil. Fill barrel with posts -- butt end down. Pour penta oil mix into barrel to height six inches above proposed ground line on post.

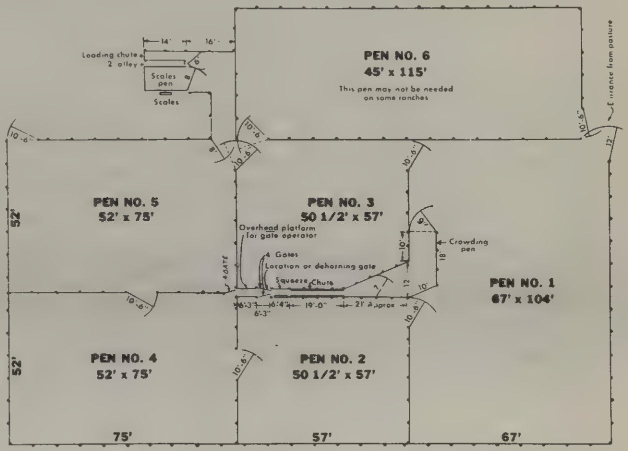
Montana State

Check time for 1/2 to 3/4 inch penetration of preservative by sawing a treated sample of post wood and examining the end cross-section. Time batch treats accordingly and add penta oil mix as needed to keep treatment to desired level on posts.

TREAT POST TOPS to prevent top rot. Just switch ends of treated posts and give tops a 15-minute preservative bath.

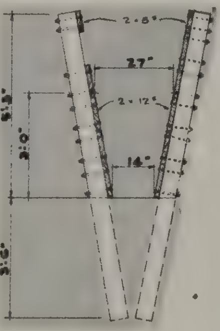
HANDLING EQUIPMENT

WORKABLE CORRALS and equipment for handling cattle are an economy. Build them strong and keep them in good repair.



Texas A & M College

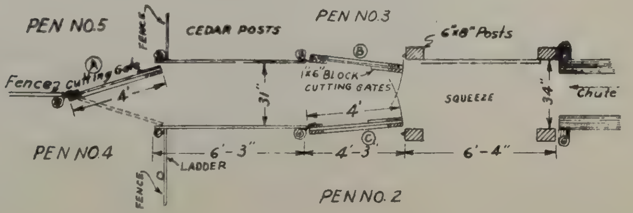
A set of scales is desireable but not essential. It will pay for itself over a period of years.



Am. Hereford Assn.

SLOPE-SIDED CHUTES handle horned cattle, yet are narrow enough at the bottom to prevent young stock from turning. Chute approach should always have one straight side. The chute should be long enough to accommodate four or more animals.

A good location for the squeeze is at the exit end of the chute. If placed here, the headgate should be removable to give straight-through access to cutting gates. Cutting gates can be operated by levers from an overhead platform or by a rope-pulley system.

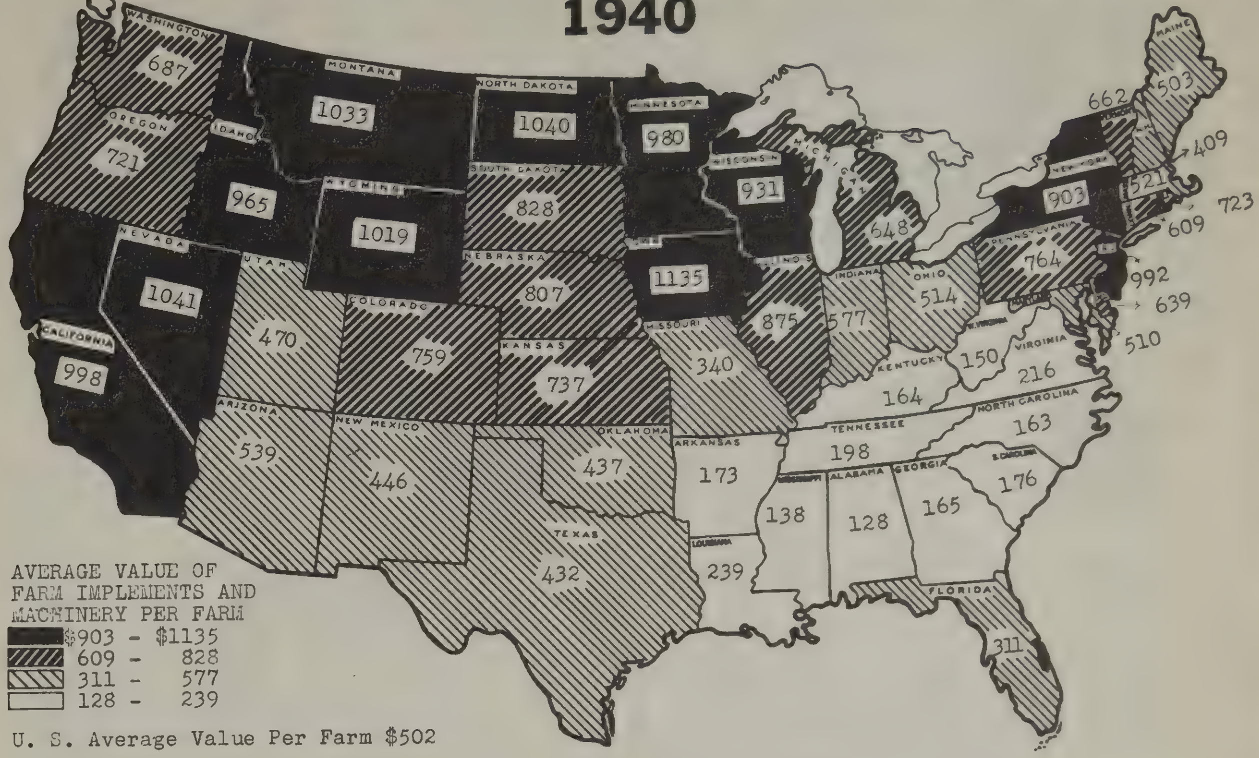


PLAN OF CUTTING GATES

Texas A & M College

350 Equipment, Facilities

VALUE OF FARM IMPLEMENTS AND MACHINERY PER FARM
1940



U. S. Average Value Per Farm $502

The map showing the average value of farm implements and machinery per farm indicates distinct regional variations. South of the Ohio River and as far west as the states of Arkansas and Louisiana the investment per farm averages very low. In Alabama the average is only $128 per farm. This low investment directly reflects the inter-relation of great social and economic forces which have until now resisted the adoption of labor-saving machinery in these areas. Briefly these forces can be outlined as follows:

1. Small farms - many too small to justify tractor-drawn equipment.
2. Supplies of cheap labor - represented in the large negro population of the area.
3. Cotton farming and the lack of satisfactory mechanical harvesting equipment.
4. Slow recovery from the depression of the early 30's. Over most of this area poor soils and low yields per acre are contributing factors.

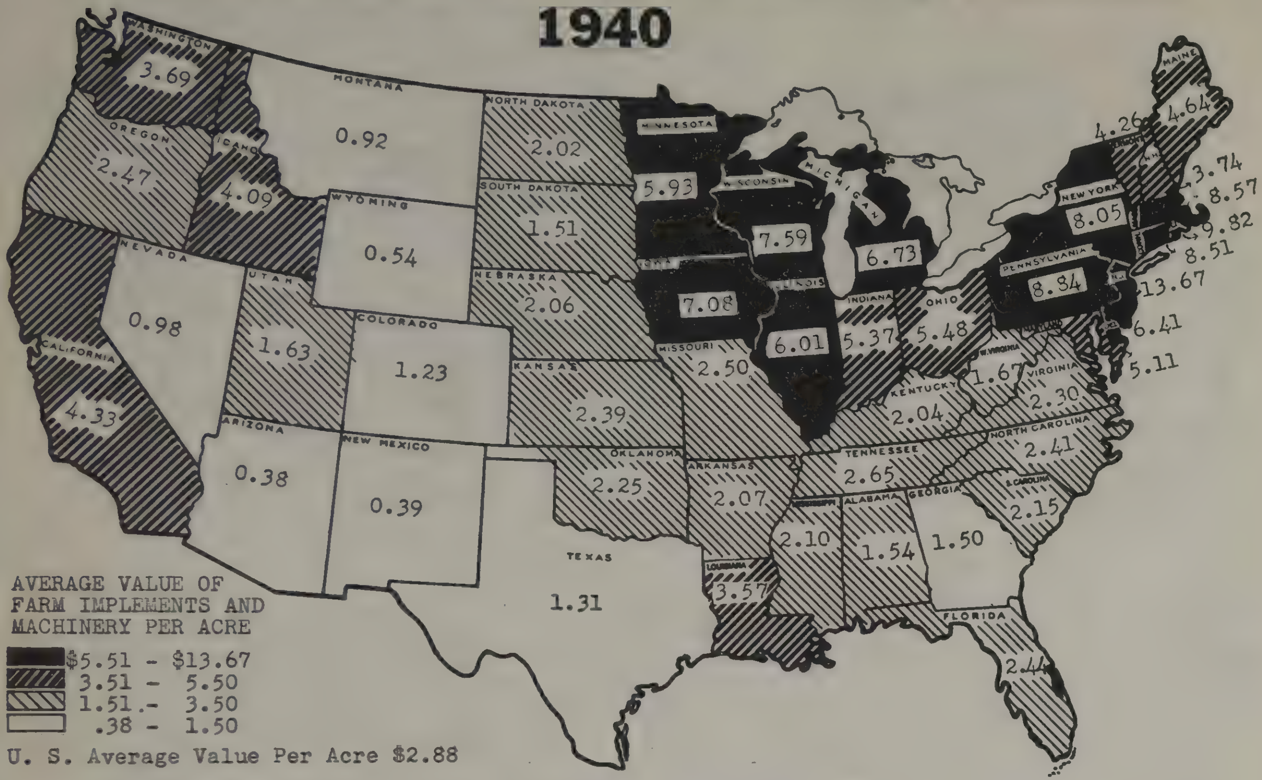
The North Central, Northern Mountain, and Pacific Coast States show large investments in farm machinery per farm. Large investments in these areas are encouraged by the following factors:

1. Extensive farming and ranching in large tracts. This is especially true in the West North Central and Mountain States.
2. Limited supplies of labor. Density of farm population in relation to land resources is low throughout most of this area.
3. Grain system of farming and the general adaptation of farm machinery to every need from planting to harvesting.

This map should be studied along with the maps showing such features as the size of farms, types-of-farming, and land productivity. By bringing all of these factors together the reasons and necessity for varying investments will be revealed. See also the average per acre investment in implements and machinery on the reverse side of this page.

Based on Census Data

VALUE OF FARM IMPLEMENTS AND MACHINERY PER ACRE
1940



AVERAGE VALUE OF
FARM IMPLEMENTS AND
MACHINERY PER ACRE

▇ $5.51 - $13.67
▨ 3.51 - 5.50
▧ 1.51 - 3.50
☐ .38 - 1.50

U. S. Average Value Per Acre $2.88

The average value of farm implements and machinery per acre is high in the region north of the Ohio River and westward from the Atlantic coast to Iowa and Minnesota.

The principal factors which contribute to this high concentration of machinery are:

1. High ratio of fertile land to total land area and/or the intensive utilization of all available land resources.
2. Restricted supply of labor. Industrial production is concentrated in this general territory and competition for labor is very keen especially in the eastern half or two-thirds of the area.

Texas and most of the Mountain States show a low average value of farm implements and machinery per acre. Five states show less than one dollar (two less than 40 cents) per acre so invested. The principal reasons for this low investment per acre are:

1. Low ratio of tillable land to total land area.
2. Tendency to farm large fields with one set of equipment.
3. Predominance of ranching which requires a minimum of implements and machinery per acre.

In the South Central States where cotton is "king" the investment per acre in machinery is only slightly over two dollars per acre and in Georgia drops to $1.50 per acre. This is true in spite of the fact that the land is farmed in small tracts with much intensive cropping.

These figures are important indexes for businesses selling either farm implements and machinery, or other goods and services of equal necessity and appeal. The map indicates such features as, need for implements and machinery, ability to buy, and the extent of use of modern equipment. Farmers of some areas, because of low farm income per acre are forced to continue to use cheap inefficient implements and machines.

Business organizations serving extensive areas should bring together and weigh the significance of such data as is shown here, in formulating sales policies and business development plans.

Based on Census Data

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

ELECTRICITY -- MEANS BETTER LIVING FROM BETTER FARMING

SITUATION WANTED - Hired hand willing to work for $10 to $15 per month. One that never gets tired, never sleeps, never eats. One that for 5 cents will:

☞ milk 50 cows, or
☞ pump 1000 buckets of water, or
☞ shell 75 bushels of corn, or
☞ separate 5,000 pounds of milk, or
☞ saw 2 cords of wood.

For further information, call Mr. Kilowatt Hour.

This ad may never appear in a newspaper. But it very easily could. For this hired man - ELECTRICITY - will do what the ad says. He is already present on three out of every four farms in the United States -- just waiting to be put to work.

Electricity can do much of the work that the farmer or hired man does now - AND will do it much cheaper. It will put the hay in the barn, put the corn in the crib, dry it, and then grind it, feed and water the chickens, milk the cows, and do a hundred other jobs on the farm.

ELECTRICITY AT WORK

ON THE FARM	
AN ELECTRIC PIG BROODER	→ Saves 1½ pigs per litter
POULTRY HOUSE LIGHTING and water warming	→ Means 11 to 19½% more eggs
ELECTRIC WATER SYSTEM	→ Means 5 to 10% more milk
ELECTRIC MILKING MACHINE (30 cow herd)	→ Saves 684 hours per year
IN THE HOME (Family of 4 to 5)	
AN ELECTRIC WATER SYSTEM	→ Saves 28 Days* per year
AN ELECTRIC WASHING MACHINE (over hand washing)	→ Saves 6 Days* per year
AN ELECTRIC IRON (over sadiron)	→ Saves 11 Days* per year
AN ELECTRIC REFRIGERATOR	→ Saves 8¼ Days* per year
* 8 hour day	Source - College and USDA Data.

FARM IS A FACTORY

More and more the farm must be regarded as a factory - a factory to produce corn, cotton, milk, beef, pork and many other products. Just like other factories, the farm factory is a business of narrow margins and must produce more goods at less cost. The acre of land will be the producing unit. The more it produces the greater will be the return. Electricity will take the place of muscles in this farm factory. Each farmer will produce more crops - more livestock, and the cost of producing each unit will be lower.

ELECTRICAL FARMING MEANS CHANGES

Electrical farming will bring labor efficiency to the farm buildings as tractor farming has brought it to the fields. The average farmer spends from one-third to one-half of his time working around the buildings. Dairymen and poultrymen spend 75 to 90 per cent of their work-time at the buildings. Part of our farm factory has been loafing - only operating at half speed or less. Bringing it up to full speed is going to mean changes -- lots of changes.

Tractor farming meant a lot of changes from horse farming. It didn't stop with merely substituting tractors in the place of horses. This was just the first step. It meant new tools - new implements, new buildings - new ways of doing things. Then it called for different rotations, different ways of cultivating and harvesting crops, and even new varieties of corn and cotton, and other crops.

Likewise, electrical farming calls for a lot of changes from "muscle farming". It means a lot more than putting in an electric motor here and there to save a little time - or to do some job easier. It means farming that will take full advantage of this cheap power - farming that recognizes that the use of electricity is dependent upon the soil, its fertility and its tillage.

If you are going to get the most profit with the least cost, you must use electricity as a TOOL - a tool of production. It's not enough that electricity will pay its own way or just be convenient. It must increase farm income.

An electric milker is fine. It saves lots of hard work. An electric water pump for the dairy barn is a good thing. It saves you from carrying many thousands of gallons of water several hundred miles during a year's time. But this is just part of the story of electrical farming. You've saved time - cut down on a couple of big jobs. But have you increased the output of the factory?

Now you have time to grow more pasture, raise more hay, put up more silage, milk more cows - and sell more milk. This means you can produce greater volume - and volume farming means a bigger farm business with lower costs per unit and more money for the operator!

ELECTRICITY - MEANS BETTER LIVING FROM BETTER FARMING

An REA survey compared production on a group of midwest farms before and after electricity was put to work. There was a 27 per cent increase in acreage, a 46 per cent increase in milk cows, a 55 per cent increase in laying hens - and a drop of 10 per cent in number of full-time men employed.

Electricity is a "profit maker" -- but *how much profit* depends on how you use it and how you use the time it saves you. The addition of another cow, a few more sows, or a hundred more hens is the pay off.

CAN YOU AFFORD IT?

If you take full advantage of electricity and use it as a TOOL, you can't afford not to use it. For it means bigger milk checks, more eggs to sell, more hogs to market at less cost. It means extra profits - and extra profits mean a new refrigerator - or water pump - or new car - something to make living better. Because electricity means better living for the farm family, it can be justified as a cost.

WIRING PLAN IS ESSENTIAL

The first step towards the efficient use of electricity on a farm is to make a plan of how you are going to use electricity in the future. Even though you are probably already using electricity, it pays to make a complete study of the electrical needs and wiring for your farm.

After needs and future uses are agreed upon, your present wiring system can be fitted into a long-time electrification plan. If the farm is not yet wired, a wiring system can be planned that will serve all future needs. A good job at the start is the cheapest job. Otherwise in a few years as you add extra appliances or equipment, you may have to come back and tear out all the wires and start from scratch.

The requirements of a wiring system are that it be safe, economical, flexible, and adequate to do the job. Some of the points to consider in wiring a farm are:

1. Power lines should be run to a pole near the center of the farm buildings. From this central pole, separate lines can be run to the house, barn, poultry house, etc.

2. Three lines should be run to the house. You will need three lines if you ever use an electric stove or large deep freeze.

3. Lines to house should enter at or near the kitchen, as this is where most of the power is used.

4. The main power switch should be far enough away from the house so that the water pump could operate if the house caught on fire.

5. Wire should be large enough to handle the job to be done. If undersize wires are put in, motors and other such equipment won't run satisfactorily, and will cost more to operate.

The size of a water pipe is pretty important in determining how much water that pipe will carry. You don't use the same size pipe with a big pump as with a little pump. Likewise you can't use small wire to carry electricity to a big motor. The size wire to use depends on the equipment, the load, and the distance from the meter. Check with the local power company when wiring.

6. Three No. 8 or larger wires should be run to barns, dairy buildings, and farm shop.

7. Each building should have its own fused switch so that the entire building can be cut off at one time.

COST OF ELECTRICITY FOR VARIOUS JOBS

ON THE FARM	COST AT 2¢ PER KW. HOUR		COST AT 2¢ PER KW. HOUR	IN THE HOME (AV. FOR FAMILY OF 4 OR 5)	COST AT 4¢ PER KW. HOUR
Barn ventilator	5¢ per cow per mo.	Milk cooler	50¢ per 10 gal. per mo.	Churn	6¢ per 100 lbs. of butter
Bottle washer	1¢ per 1000 btls.	Milking machine (portable)	3¢ per cow per mo.	Clock	8¢ per mo.
Brooder	1¢ per chick	Milking machine (pipe line)	5¢ per cow per mo.	Coffee percolator	20¢ per mo.
Cider mill (small)	2¢ per 100 gal.	Paint spray	3¢ per 1000 sq. ft.	Dish washer	10¢ per mo.
Concrete mixer	1¢ per cubic yd.	Poultry house lighting	10¢ per 100 birds per mo.	Fan (small)	8¢ per mo.
Corn husker-shredder	60¢ per 100 bu. corn husked	Poultry water heater	2¢ per day	Fan (kitchen)	32¢ per mo.
Corn sheller	2¢ per 30 bu. shelled corn	Seed cleaner	2¢ per 100 bu.	Heating pad	4¢ per mo.
Cream separator	1¢ per 1000 lbs. of milk	Sheep shearer	4¢ to shear 100	Hot plate	4.00 per mo.
Dairy water heater	2¢ per 5 gal. of hot water	Straw cutter	4¢ per ton	Iron (hand)	20¢ per mo.
Ensilage cutter	1¢ per ton	Threshing machine	2¢ per 8 bu.	Ironer	40¢ per mo.
Electric fence	14¢ per mo.	Tool grinder	1¢ per hour	Ice cream freezer	16¢ per mo.
Feed cutter and shredder	4¢ per ton	Ultraviolet lights for poultry	20¢ per 100 hens per mo.	Lighting	80¢ per mo.
Feed grinder	1¢ per 100 lbs.	Utility motor (1/4 hp.)	1¢ per hour	Quick Freeze box	6.00 per mo.
Grain elevator	8¢ per 1000 bu.	Utility motor (3 hp.)	6¢ per hour	Radio	.32¢ per mo.
Hay baler	5¢ per ton	Utility motor (5 hp.)	10¢ per hour	Refrigerator	1.40 per mo.
Hay dryer	80¢ per ton of dry hay	Water pump (shallow well)	30¢ per mo.	Sewing machine	2¢ per mo.
Hay hoist	2/3¢ per ton	Water pump (deep well)	40¢ per mo.	Stove (special rate)	2.50 per mo.
Hotbed	2¢ per sq. yd. per day	Welder	18¢ per mo.	Toaster	12¢ per mo.
Incubator	2¢ per 25 eggs set	Wood saw	4¢ per cord	Vacuum cleaner	8¢ per mo.
Irrigation (surface)	6¢ to raise an acre ft. of water 1 ft.			Waffle iron	8¢ per mo.
				Washing machine	12¢ per mo.
				Water heater	Special rate approx. $2.50 per mo.

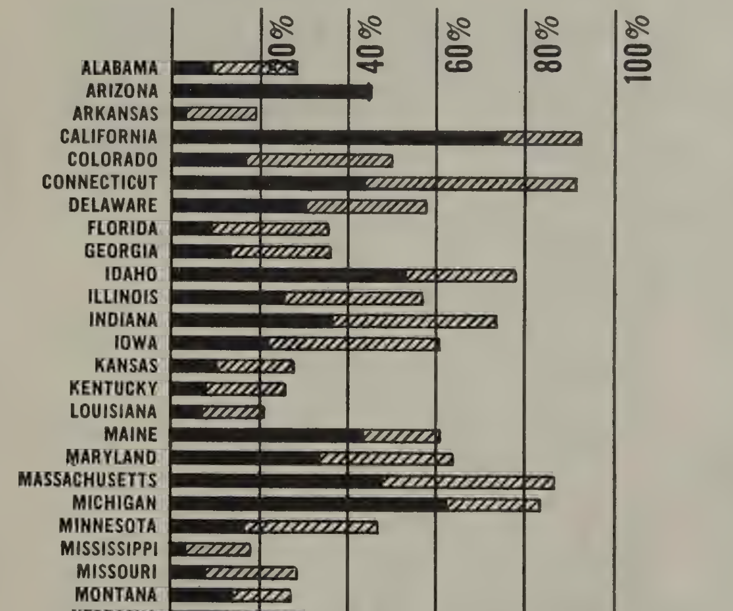
Source - Based on College Data.

RURAL ELECTRIFICATION

As of September 30, 1945, 2,725,000 farms were electrified. This is approximately 44.7 per cent of all farms in the country. There was little more than 10 per cent electrification just before REA was established.

In September, some 437,568 miles of REA-financed lines were serving more than 1,344,144 farm families and other rural users. In addition, 112,000 miles of lines for which funds have been set aside are either under construction or being surveyed and planned.

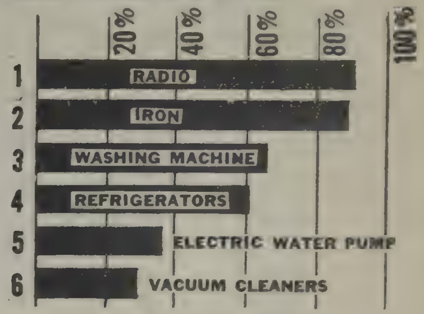
PER CENT OF U. S. FARMS ELECTRIFIED AS JUNE 30, 1945



Rural Electrification Administration

MOST POPULAR APPLIANCES

120 R.E.A. SYSTEMS IN 33 STATES



R.E.A. BY STATES

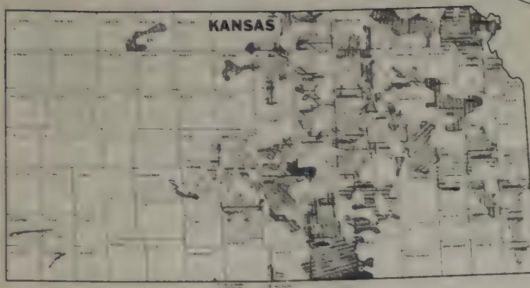
As of September 30, 1945

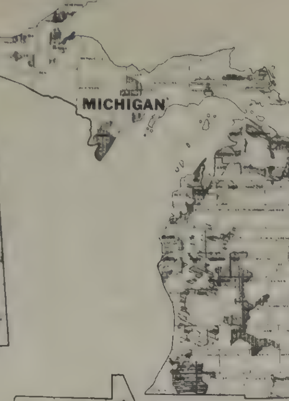
	Systems[1] Energized	Miles Energized	Consumers[1] Connected
UNITED STATES	835	437,568	1,344,144
Alabama	22	10,821	42,828
Arizona	[illegible]	632	2,255
Arkansas	17	10,080	32,616
California	4	1,502	4,596
Colorado	19	7,443	21,500
Connecticut	0	0	0
Delaware	1	1,012	3,225
Florida	15	4,102	13,401
Georgia	42	21,468	78,527
Idaho	9	3,130	7,626
Illinois	28	21,610	60,592
Indiana	44	23,242	79,330
Iowa	53	29,695	71,266
Kansas	22	9,895	20,019
Kentucky	25	14,067	54,285
Louisiana	15	7,652	24,877
Maine	4	448	1,427
Maryland	2	1,680	5,248
Massachusetts	0	0	0
Michigan	13	9,845	34,677
Minnesota	49	31,816	72,108
Mississippi	23	15,633	55,705
Missouri	38	21,687	66,813
Montana	12	3,339	8,050
Nebraska	23	12,382	25,722
Nevada	1	121	463
New Hampshire	1	1,418	2,969
New Jersey	2	416	1,617
New Mexico	6	1,401	3,933
New York	6	2,694	9,212
North Carolina	33	12,723	47,438
North Dakota	7	3,367	6,911
Ohio	28	19,001	66,557
Oklahoma	23	14,775	34,933
Oregon	13	2,951	10,279
Pennsylvania	13	10,162	34,575
Rhode Island	0	0	0
South Carolina	23	11,009	35,582
South Dakota	7	2,374	4,892
Tennessee	29	12,562	90,881
Texas	71	42,556	106,839
Utah	3	726	2,485
Vermont	3	1,085	2,981
Virginia	16	9,298	28,928
Washington	20	6,431	14,137
West Virginia	2	548	1,745
Wisconsin	30	16,195	43,759
Wyoming	12	2,410	6,112
Alaska	2	113	777
Virgin Islands	1	52	447

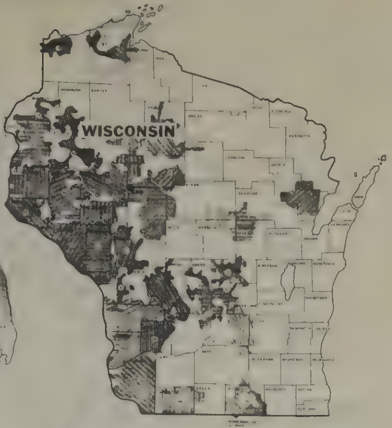
[1] Includes latest available figures for systems paid in full.

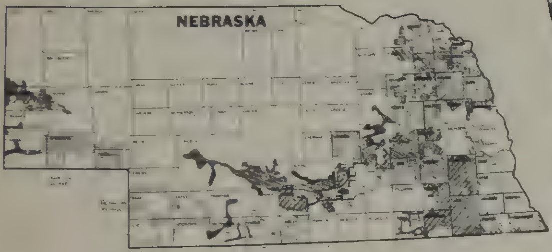
RURAL ELECTRIFICATION ADMINISTRATION

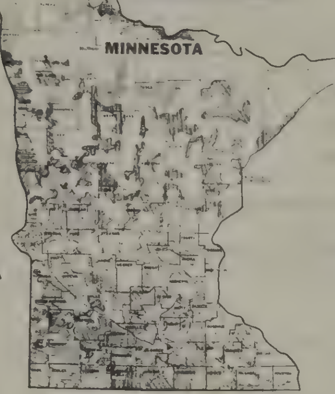
STATUS OF PROJECTS AS OF JANUARY 1, 1945

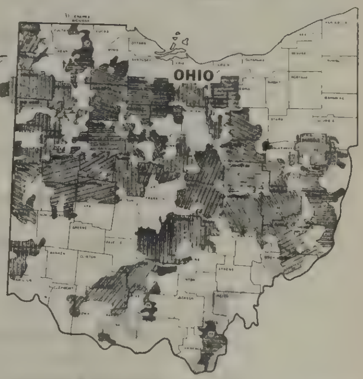


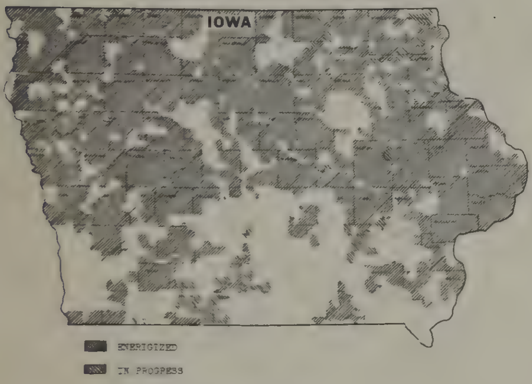


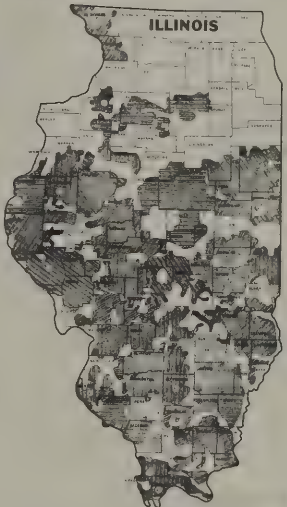


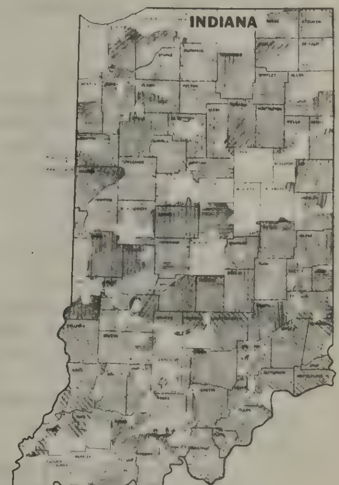


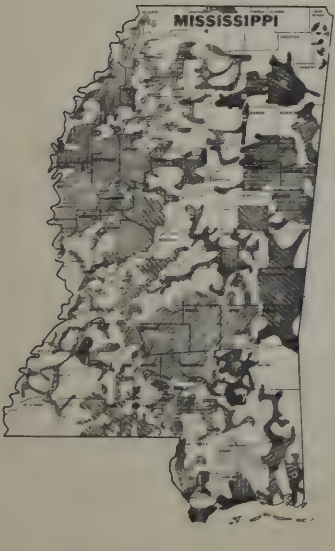






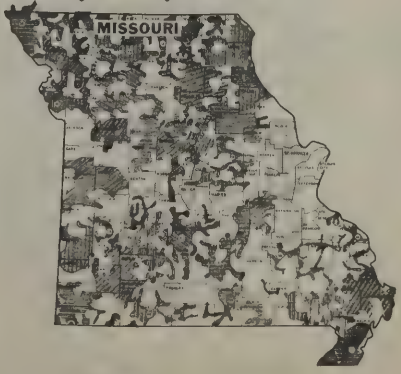






▨ ENERGIZED

☐ IN PROGRESS

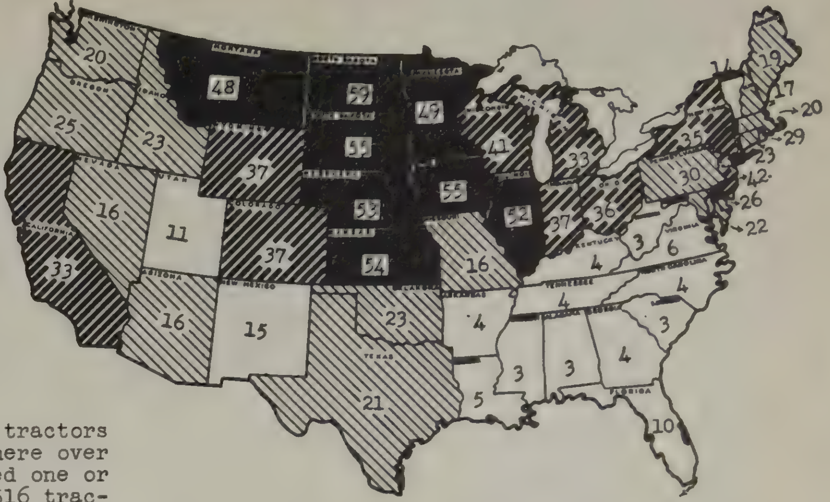


	SYSTEMS ENERGIZED	MILES ENERGIZED	CONSUMERS CONNECTED
1936	11	400	693
1937	45	8,000	19,611
1938	248	41,736	104,528
1939	417	115,230	268,000
1940	630	232,978	549,604
1941	732	307,769	779,561
1942	789	369,129	981,193
1943	805	381,747	1,041,821
1944	815	397,861	1,152,031
1945	832	424,072	1,287,347

U.S. TOTALS · SEPTEMBER 30, 1945

R.E.A. ELECTRIFICATION ADMINISTRATION

FARMS WITH TRACTORS



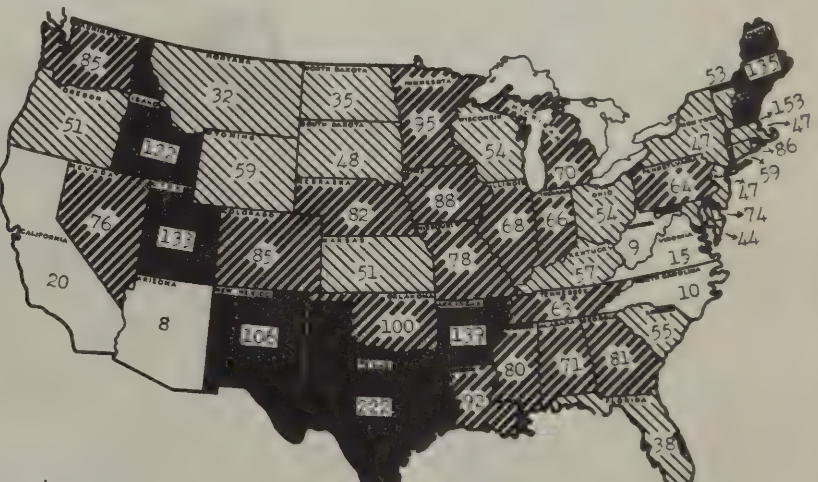
More than three-fifths of all tractors are in the North Central States where over three out of every five farms reported one or more tractors. Iowa leads with 128,516 tractors. Wheat regions in which large farms, large fields, and smooth topography are the rule, have the highest proportion of farms with tractors. The western part of the Corn Belt has almost as high a percentage. Much of the Hay and Dairy region is also high.

The most striking contrast is between the North and the South. The Old South has responded comparatively slowly to mechanization - due in part, no doubt, to cheap labor.

Tractors are most numerous in the Corn Belt and the Hay and Dairy Belt, including southeastern Pennsylvania, due to the large number of farms and high percentage of farms with tractors. The number is also large in both the Hard Winter and Spring Wheat Belts, and in the cultivated valleys of California. These are in general regions of fertile soils and developed farms operated by aggressive farmers.

PERCENTAGE INCREASE IN TRACTORS

Percentage Increase In Number of Farms Reporting One or More Tractors
1930 to 1940



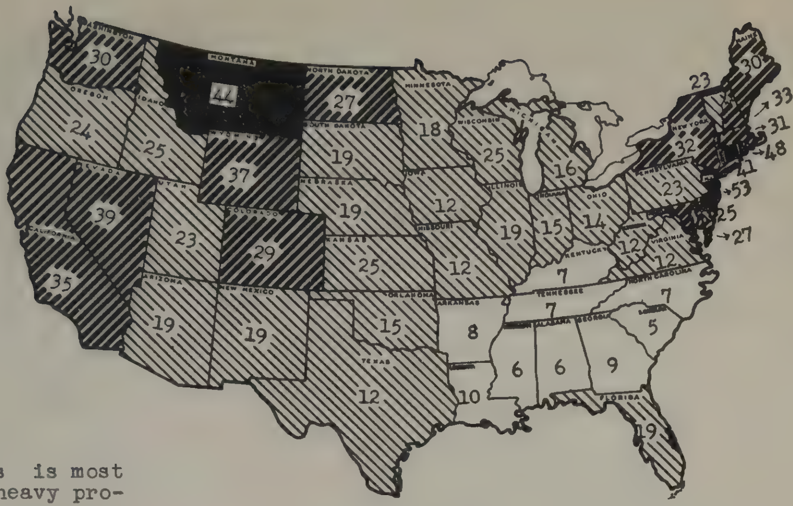
The number of farms reporting tractors increased in the ten years, 1930-1940, from 851,457 to 1,409,697 - a percentage increase of 65.6. This map should be studied in relation to the per cent of farms reporting tractors and to the change in horse and mule numbers. (Digest page 205)

While the largest percentage changes have occurred in the South and Southwest, the greatest increases in total numbers have occurred in the Corn Belt and Wheat Belts. Figures for the South are not comparable to the rest of the United States due to counting, small cropper acreages as farms.

Probably a chief reason tractors have been so slowly adopted in the South is the lack of mechanical cotton pickers.

Based on Census Data

TRUCKS



PERCENTAGE OF FARMS HAVING ONE OR MORE MOTORTRUCKS ON APRIL 1, 1940

■ 41 - 53
▨ 26 - 40
▧ 11 - 25
□ 5 - 10

U. S. Average 15.5%

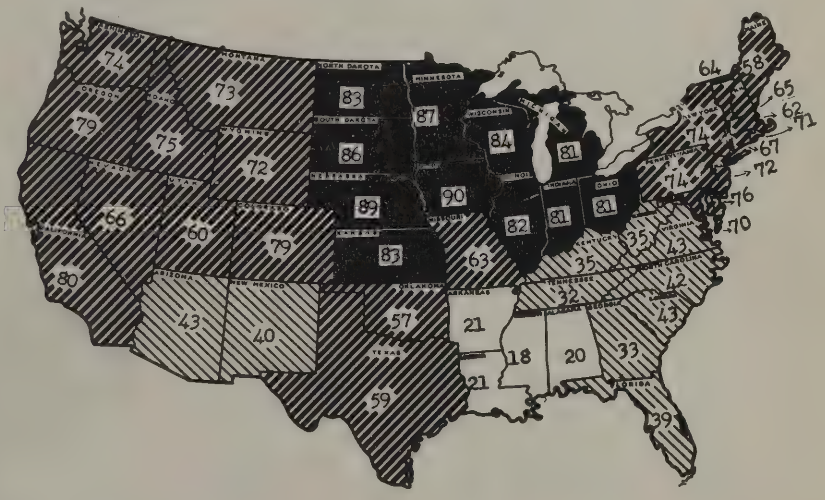
The use of trucks by farmers is most common in the North where there is heavy production and in the West where farms and ranches are large and distances great.

In most of the South the percentage of trucks to total farms is small, although the figures are not comparable to the rest of the United States due to counting cropper acreages as farms.

Trucks are most numerous in eastern Wisconsin, and the more intensively operated portions of the New England and neighboring states such as New York, New Jersey, Pennsylvania, Delaware, and Maryland. In the North there appears to be a definite association with dairying and truck growing.

The average latest model found on farms in 1940 was 1933 with not quite one-third models of 1930 or earlier.

AUTOMOBILES



PERCENTAGE OF FARMS HAVING ONE OR MORE AUTOMOBILES ON APRIL 1, 1940.

■ 81 - 90
▨ 51 - 80
▧ 31 - 50
□ 18 - 30

U. S. Average - 58%

Automobiles on the farms are used both for pleasure and business. On many farms they largely take the place of a farm truck.

The use of automobiles is definitely related to the agricultural resources of the region. The North Central States, which include the Corn Belt, much of the Northern Dairy Belt, and a large part of the Wheat Belt have more automobiles per farm than any other great agricultural region in the World.

Numbers are lowest in the South but the figures are not comparable to the rest of the United States due to counting cropper acreages as farms.

The latest models on farms averaged 1933 but 30 per cent were models of 1930 or earlier. About 6 out of every 10 farms have an automobile.

Based on Census Data

FARM MECHANIZATION

In 1850, animals contributed 79 per cent of farm labor energy, humans 15 per cent and machinery only 6 per cent. It is now estimated that machines do 92 per cent of the farm work.

INCREASED OUTPUT

The shift to mechanical power and equipment increases the output per worker -- he does the job faster and better and fewer workers are needed in farm production.

With a tractor and power equipment 3 acres of land can be prepared and planted to corn during the time that one acre is planted with work animals. If a tractor is put on a 24-hour schedule, which is not possible with work animals, the preparation and planting job can be done 7 times as fast as with animal power.

AVERAGE HOURS OF LABOR USED PER ACRE AND PER UNIT OF PRODUCTION -- SELECTED PERIODS 1910-48

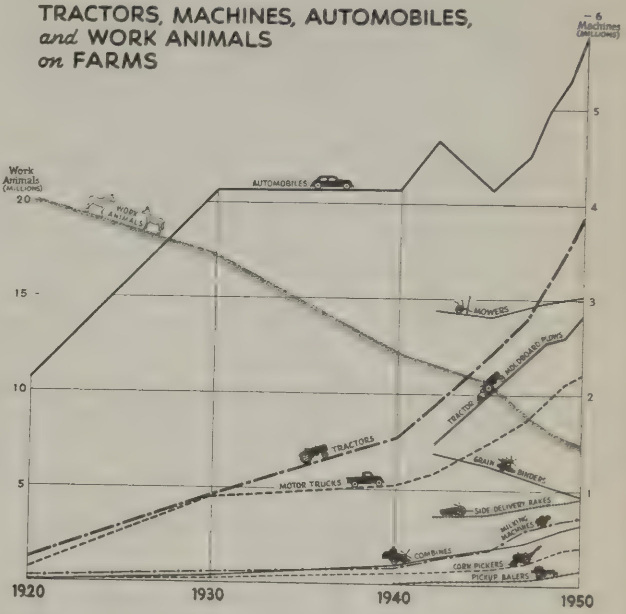
	1910-14	1935-39	1945-48
Corn:			
Man-hours per acre	35	28	24
Yield, bushels	26	25	35.2
Man-hours per 100 bu.	135	112	67
Oats:			
Man-hours per acre	16	10	8
Yield, bushels	29.4	29.2	35
Man-hours per 100 bu.	53	35	23
Wheat:			
Man-hours per acre	15	9	6
Yield, bushels	14.4	13.2	17.7
Man-hours per 100 bu.	106	67	34
Cotton:			
Man-hours per acre	116	99	102
Yield, pounds	200.6	226.2	268.6
Man-hours per bale	277	210	182
Soybeans:			
Man-hours per acre	--	12	10
Yield, bushels	--	18.5	19
Man-hours per 100 bu.	--	64	52

Source: Misc. Publication 707 USDA

THE TREND -- UPWARD

Tractors -- The shift from horse power to tractor power has been rapid since 1945. Even many established tractor farms added another tractor when the last team was sold.

In many southern states, there are now twice as many tractors as in 1945. The percentage increase in numbers of all kinds of tractor drawn machines in the South has been much above the average of the country. Mechanization has made tremendous gains, but the degree of mechanization in the South is still behind that of the rest of the country.


TRACTORS, MACHINES, AUTOMOBILES, *and* WORK ANIMALS *on* FARMS

Plows -- Changes in numbers of moldboard and disk plows follow closely the change in tractor numbers as a fairly constant percentage of tractors are equipped with moldboard or disk plows. Moldboard plows are used in practically all areas, mainly in the Corn Belt, Lake and Northeastern states. Disk plows are used mostly in the western dry farming areas, along the Pacific Coast and in the South.

Grain Drills -- 4 per cent fewer grain drills are now on farms than in 1942. There have been increases in the Mountain and Southern states. The average size of the grain drill has increased since 1942. Most of the new grain drills are made for use with tractor power. The proportion of drills with fertilizer and grass seed attachments has been increasing in recent years along with the large increase in the use of fertilizer.

Combines -- Increases since 1945 total 71 per cent. Of the 640,000 combines, 32 per cent are in the Corn Belt and 36 per cent in 8 major wheat states. The combine is now the standard harvest machine in all small grain and soybean areas. The number of grain binders has declined 32 per cent since 1942.

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FARM MECHANIZATION

Corn Pickers -- The number has more than doubled since 1945. Nearly 60 per cent of the 400,000 pickers are in the 5 Corn Belt states. A large proportion of pickers in the Corn Belt are two-row pickers. Since 1945, increases in numbers have been significant in Pennsylvania and in the Plains states.

Mowers -- More than 3,000,000 mowers are estimated to be on farms. Only slightly over one-third of these are power mowers (cutter bar operated with tractor power) but they cut at least two-thirds of the annual hay crop.

Side-Delivery Rakes -- Numbers are estimated at 915,000. Increases in recent years have been important in some southern areas where they have been used in the peanut harvest. The greatest number are found in the major hay areas of the North and East.

Milking Machines -- Increased from 255,000 in 1942 to 710,000 at the present time.

Manure Spreaders -- There are 1,395,000 spreaders in use -- up 20 per cent since 1942. These machines are concentrated in the Lake, Corn Belt and Northeast states.

COST OF USING FARM MACHINERY

The following table shows the approximate acres or hours of work that should be done with machines of different sizes to obtain reasonable machinery costs per unit.

Kind of Machine	Size	Approximate Range in drawbar Horsepower of Tractors Used	Annual Use	
			Acres	Hours
HARVESTING EQUIPMENT				
Combine, without motor	5 foot	11-20	160	130
Combine, with motor	10 foot	21-25	350	155
Combine	14 foot	Self-propelled	495	135
Corn picker	1 row	11-20	140	160
Corn picker	2 row	21-25	300	200
Hay rake, side-delivery		6-10	170	65
Mower	7 foot	11-20	160	70
LAND PREPARATION AND TILLAGE EQUIPMENT				
Disk, tandem	8 foot	11-20	295	120
Harrow, spike-tooth	20 foot	11-20	365	65
Lister cultivator	2 row	11-20	180	95
One-way disk	9 foot	26-30	555	175
Plow, gang	2-16 in.	11-20	125	110
SEEDING EQUIPMENT				
Corn planter	2 row	6-10	110	40
Grain drill	10 foot	11-20	160	55
Lister	2 row	11-20	125	75
Duster	8 row	11-20	190	25

Source: Bul. 391, University of Nebraska

Power and machinery constitute about 20 per cent of the cost of grain production and 30-40 per cent of hay production in western Illinois. A good power and machinery program will not make a poor farmer successful, but an unwise power and machinery program can bankrupt any farmer.

Machinery costs can be reduced by:

❶ Proper care, repair and adjustment.

❷ Sharing machinery -- you and your neighbor each buy a different piece of expensive machinery and then exchange work.

❸ Cooperative ownership -- buy and use machinery in cooperation with some other person or persons.

❹ Custom work -- do work for others, thereby increasing the productive use of the machine.

There are three general classes of machinery costs: (1) fixed costs, (2) depreciation, and (3) operating costs. The cost of using any particular machine is determined largely by the units of work done during the year. Costs per acre or per hour are high for machines that are operated very little during a season.

ANNUAL TRACTOR USE

Tractors were used an average of about 400 hours in 1920 and in 1930. By 1940 they were used almost 500 hours and in 1947 this had increased to 592 hours. Annual use of tractors varies widely with tractor age.

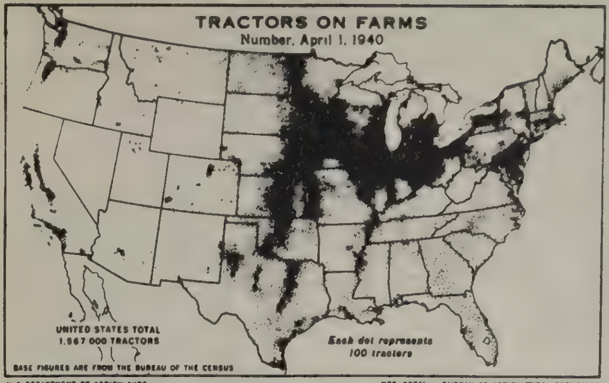
The larger wheel and crawler tractors were used more hours than were the smaller tractors. Wheel tractors with 12 to 18.4 hp ratings were used 622 hours per year while those with over 25 hp were used 752 hours. For wheel tractors use varies from a low of 553 hours per year in the Northeast and Pacific regions to a high of 768 hours of annual usage in the Oklahoma-Texas area.

LIFE OF THE FARM TRACTOR

A nation-wide tractor study made by the USDA Bureau of Agricultural Economics in February, 1948 indicates that the average life of a farm tractor is about 19 to 20 years.

Many economic factors have contributed to the long life of farm tractors: for example, the tremendous demand for tractors during the war years and in the immediate post-war period. Another factor is the demand for used tractors by operators of small farms, because of lower first cost and less depreciation on used machines. Under normal supply conditions many used farm machines have a market value of less than 50 per cent of their new cost at the end of five years.

MECHANIZATION OF AGRICULTURE



U S DEPARTMENT OF AGRICULTURE NEG 39741 BUREAU OF AGRICULTURAL ECONOMICS

The greatest concentration of tractors in the country in 1940 was in the Midwest; some smaller areas in other parts of the country also showed heavy concentration of tractors.

Farm production topped all previous records in 1946. Economists can hardly believe the figures; yet, after a decade of good crops, it is becoming clear that American agriculture is entering a new era. At the present rate of production, farmers could feed 50 million more people than in the years 1935-39, assuming the same dietary level in both cases. The old order is giving place to the new.

Agriculture is being emancipated by modern machinery. Tractors, trucks, and automobiles are replacing horses and mules just as the oxen used by our forefathers were replaced. Only about one-fourth of the 25 to 30 per cent increase in agricultural output since 1940 is due to the accident of weather. The balance is due to mechanization and changes in the use of land, fertilizer, crops and livestock, plus high prices and other wartime incentives.

"Mechanization is the most important factor back of the increased output of farm products for human use. The number of tractors on farms gradually increased from less than 250 thousand in 1920 to over 2 million in 1945. Increased use of mechanical power and associated equipment usually means more total production, but its most important effect is that a much larger share of the product goes to market. As mechanical power is substituted for draft animals, the land formerly used for horse and mule feed becomes available for producing commodities for human use. The shift to mechanical power from 1920 to 1945 made available about 55 million crop acres, or about 15 per cent of the available cropland, for the production of marketable commodities. In World War 1 this large area of cropland and millions of acres of pasture had to be used for producing horse and mule feed...

"To the approximately 50 million acres of cropland released by the shift from animal power to mechanical power in these decades another 5 million acres were added in the years 1940-45. This release of cropland for the production of marketable products is of course the most startling effect that mechanization has had on American farms" ... It takes 5 acres to feed a horse capable of working 22 acres. Thus, one out of every four acres formerly went to support draft power.

"The effects of the greater timeliness in farm operations that is possible by mechanization are difficult to measure, but obviously the result is both greater total production and higher quality of farm products.. "With a tractor and power equipment 3 acres of land can be prepared and planted to corn during the time that one acre is planted with work animals. If the tractor is put on a 24-hour schedule, which is not feasible with work animals, the preparation and planting job can be done seven times as fast as with animal power...

"Wartime shortage of labor stimulated the attempts by farmers to buy more and more labor-saving equipment. Limitations on the manufacture of tractors and other farm machines held down the increase in farm mechanization, but despite these restrictions there were notable increases in labor-saving equipment on farms during the war. For example, the number of tractors on farms increased 34 per cent from 1940 to 1945. In the same period the number of grain combines increased 74 per cent; corn pickers, 53 per cent; and milking machines, 117 per cent."

American agriculture is in the throes of a drastic physical readjustment owing to new equipment now on the market or soon to become available. Out of it apparently will come:

a. many larger commercial farming units; and
b. numerous small farms which are primarily homes for part-time and subsistence farmers.

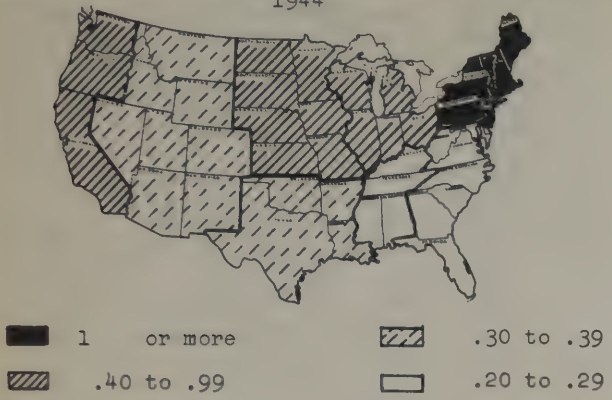
The in-between-size units will suffer constant pressure, tending to force them in one direction or the other.

In 1945 there were an estimated 2,072,000 tractors on farms; by 1950 the number will climb to about 2,600,000 if the rate of increase from 1940 to 1945 is continued. The number may possibly exceed 3,000,000 by 1950 if small tractors adapted to small acreages and hill farms become available at a price that farmers can afford to pay.

Farm mechanization, based on the acreage of cropland, has gone farther in the New England and Middle Atlantic states than in other sections of the country. The South Atlantic and South Central States have fallen behind.

Quotations from--
"Changes in Farming in War and Peace" U.S.D.A.

Number of Tractors per 100 acres of Cropland
1944



Much of this difference is the result of the relative progress made in mechanization of the various crops. "Wheat production is almost completely mechanized and corn production is well on the way in the main producing areas. Hay harvesting is in a state of flux, with several radically different methods competing for adoption in all the chief hay-producing areas. Mechanization of the cotton harvest is only in its beginning stages, and tobacco is still a hand-labor crop. Considerable progress has been made in labor-saving equipment for the dairy enterprise but relatively less attention has been given to improvements in housing and other equipment for the livestock enterprises than for crop production. Advances in this domain promise to yield substantial savings in capital investment as well as in the labor used...

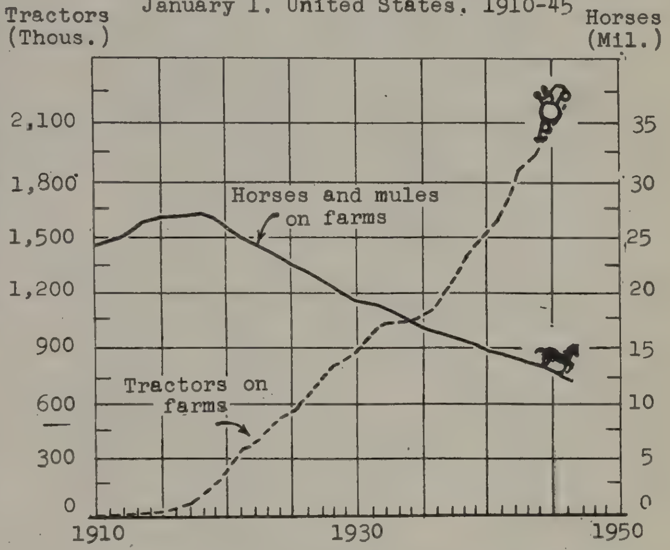
Average hours of labor used in producing major crops

	1900	1920	1940
Corn for grain			
Hours per 100 bu.	147	113	83
Yield-bu.	25.9	28.4	30.3
Wheat			
Hours per 100 bu.	108	87	47
Yield-bu.	13.9	13.8	15.9
Cotton			
Hours per bale	283	281	191
Yield-lbs. lint	198	160	257

"Mechanical pickers and flame cultivators may soon make it possible to reduce the man hours used per bale of cotton in many areas from the 191 shown in the table for 1940 to about one-fourth that figure. If fairly complete mechanization of the cultivation and harvesting of cotton could be attained the man hours used per bale of cotton might be reduced to 65 hours, as a national average. This would release 1.6 billion hours of labor on an output of 13 million bales. That is equivalent to about 800,000 man years of labor at 2,000 hours annually per worker." At Stoneville, Mississippi, cotton untouched by human hands has been produced with as little as 28 hours of labor per bale.

"If typical Corn Belt farmers were to reduce their production 20 per cent their costs per unit of product might rise as much as 15 per cent, and prices would have to be 15 to 20 per cent higher if farmers were to have the same income as they would have with a 20 per cent larger output. On the other hand, the Corn Belt farmers who reduced their costs per unit of product another 20 per cent by further adoption of improved practices usually could count on immediate gains from two sources: The wider margin between cost and selling price and the larger output per farm that commonly is associated with such improvements....

Horses and Mules, and Tractors on farms
January 1, United States, 1910-45



Mechanization is making steady progress toward a more industrialized agriculture. This trend can be expected to continue as long as the nation remains progressive. A flood of new tractors and equipment of all kinds will become available to farmers during the next two or three years.

High costs of many implements and equipment have brought criticism that is not always merited. A true measure of cost must take into consideration the efficiency of machinery and the net effect on the operating costs of the farmers making use of the machinery. When judged on this basis, much modern equipment is far cheaper than the older-style machinery. Efficient farm operators are constantly checking costs as a guide to the equipment that makes for the largest farm profits.

Quotations and Data from:
"Changes in Farming in War and Peace" U.S.D.A.

1950 CUSTOM RATES FOR FARM MACHINERY

All indications are that there will be a large amount of custom work done in 1950, with more machines available for custom operation than last year. Many farmers will be able to get some work done on a custom basis cheaper than if they buy machinery to do it themselves. Other farmers will be able to help write off a high machinery investment by doing some custom work for neighbors.

The custom rates below are reported by Doane farm managers or else are based on information from several of the agricultural colleges. Charges are based on Mid-west conditions, except where specified otherwise. These figures may not tell you what the rates for custom work should be on your farm or in your community. Too many special circumstances enter in, such as size and shape of fields, rough land, different costs of labor, etc. However, they can be used as guides in determining a fair custom rate to use in your community.

Custom rates include machine, tractor, and operator unless noted otherwise.

Harvesting

Job	Basis of Charge	Usual Rate
Corn picking		
1-row picker	Acre	$5.00
2-row picker	Acre	4.00
Hauling and binning corn	Bu.	.05
Cutting corn		
Binder	Acre	3.50
Binder with loader	Acre	4.00
Binder with loader	Hour	4.50
Combining		
Oats	Acre	4.50
Soybeans	Acre	4.50
Field beans	Acre	5.00
Special bean combine	Acre	6.00
Alfalfa and clover seed	Acre	4.50
Flax	Acre	6.00
Safflower (Calif.)	Acre	7.00
Lespedeza	Share	1/2 Share
Lespedeza	Acre	4.00
Threshing		
Wheat	Bu.	.08
Oats	Bu.	.06

Job	Basis of Charge	Usual Rate
Beans	Bu.	$ .20
Cowpeas	Bu.	.20
Clover seed	Bu.	3.00
Cutting grain with binder	Acre	2.50
Windrowing small grain	Acre	1.25
Shelling corn	Bu.	.03
Trucking corn to elevator	Bu.	.03
Field-chopping silage corn, including chopper and blower with:	Ton	2.00
1 man-2 wagons-1 tractor	Hour	8.00
2 men-2 wagons-2 tractors	Hour	10.00
2-4 men-trucks-2 tractors	Hour	12.00
Silo filling		
10 foot silo	Foot	.75
12 foot silo	Foot	1.00
14 foot silo	Foot	1.25
Digging potatoes, machine	Hour	4.00
Digging potatoes, machine	Acre	5.50
Field chopping hay or corn, to wagons only	Hour	5.00

Haying

Job	Basis of Charge	Usual Rate
Mowing hay	Acre	$1.00
Mowing hay	Hour	3.00
Raking hay		
Side delivery	Acre	1.25
Dump	Acre	1.00
Pick-up baling, hay		
Twine	Ton	3.50
Twine	Bale	.12
Wire	Bale	.14
Bale loader	Bale	.02
Stationary baling, hay	Bale	.11

Job	Basis of Charge	Usual Rate
Hauling bales to barn & storing	Bale	$ .07
Baling straw		
Pick-up	Bale	.13
Stationary	Bale	.12
Loading and hauling loose hay	Acre	3.00
Field-chopping hay, including chopper and blower with:	Ton	3.00
1 man-2 wagons-1 tractor	Hour	8.00
2 men-2 wagons-2 tractors	Hour	10.00
2-4 men-trucks-2 tractors	Hour	12.00

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1950 CUSTOM RATES FOR FARM MACHINERY

Plowing And Cultivating

Job	Basis of Charge	Usual Rate	Job	Basis of Charge	Usual Rate
Plowing, moldboard plow			Rolling	Acre	$ .75
2-bottom plow	Acre	$3.00	Cultivating corn		
3-bottom plow	Acre	3.00	Shovel cultivator	Acre	1.25
Disking	Acre	1.25	Rotary hoe	Acre	1.00
Disking and drag-together	Acre	1.50	Weeder	Acre	.75
Harrowing			Stalk cutter, power take-off	Acre	2.25
Spike tooth	Acre	.75	Cultipacker	Acre	1.00
Spring tooth	Acre	1.00	Pulling bush and bog	Acre	2.50

Planting And Drilling

Job	Basis of Charge	Usual Rate	Job	Basis of Charge	Usual Rate
Corn planting			With fertilizer and clover seed	Acre	$1.50
2-row, without fertilizer	Acre	$1.00	Drilling soybeans		
2-row, with fertilizer	Acre	1.50	2-row, without fertilizer	Acre	1.25
4-row, without fertilizer	Acre	1.00	4-row, without fertilizer	Acre	1.25
4-row, with fertilizer	Acre	1.50	Drilling beans		
Check row, without fertilizer	Acre	1.50	2-row	Acre	1.50
Check row, with fertilizer	Acre	2.00	4-row	Acre	1.50
Drilling small grain			Potato planting		
Without fertilizer	Acre	1.00	1-row, operator only	Hour	2.00
Without fertilizer, with clover seed	Acre	1.25	2-row, operator only	Hour	3.50
With fertilizer	Acre	1.25	Seeding alfalfa, clover, etc.	Acre	1.00

Spraying And Dusting

(Rates includes sprayer, tractor and operator. Charges for spraying vary greatly between different jobs, depending on size of trees, size and topography of orchard, ease of obtaining water, etc.)

Job	Basis of Charge	Usual Rate	Job	Basis of Charge	Usual Rate
Spraying weeds with 2, 4-D			Spraying potatoes	Acre	$2.00
Material included	Hour	$3.00	Dusting potatoes	Acre	1.50
Spraying fence rows, etc.	Acre	2.50	Spraying tree fruit (apples, etc.) not including material	Gal.	.02
Spraying for corn borer			Spraying citrus (California) not including material	Gal.	.01
Tractor outfit, including material	Acre	2.50	Spraying buildings with DDT	Hour	3.00
Tractor outfit, no material	Acre	1.50	Spraying buildings with paint	Square (10'x10')	2.00
Aerial	Acre	3.00			

Miscellaneous

(Rates include machine, tractor, and operator)

Job	Basis of Charge	Usual Rate	Job	Basis of Charge	Usual Rate
Boring post holes	Hole	$ .15	Harvesting sugar beets (Calif.) digger only	Acre	$10.00
Boring post holes	Hour	3.00	Truck (without operator)		
Manure loader	Hour	3.00	1-ton or smaller	Mile	.15
Broadcast mixed fertilizer	Acre	1.25	1-ton or smaller	Hour	2.50
Bulldozing	Hour	12.00	1-1/2-ton	Mile	.22
Grinding feed			1-1/2-ton	Hour	3.00
Corn	Cwt.	.13	Sawing wood, power saw	Hour	2.50 Up
Corn and cobs	Cwt.	.15	Seeding rice by airplane (Calif.)	Pound	.01
Cobs	Cwt.	.27	Spreading fertilizer by airplane (Calif)	Pound	.01
Oats	Cwt.	.22			
Harvesting sugar beets (Mich.)	Acre	20.00			

CUSTOM RATES FOR FARM MACHINERY

"Successful use of machines on more than one farm depends upon rates that are fair for both parties.

"The factors which determine rental and custom use rates for farm machinery are determined by:

"1. Actual cost of machine used per acre or per hour.
"2. Labor charges per day or per hour.
"3. Charges for ownership and risk.

"The actual cost of machine used depends upon yearly charges for depreciation, interest, repairs, housing, insurance and taxes.... Labor charges are a large factor in rental rate calculation. For this reason labor charges will vary from community to community, depending on prevailing labor rates, demand for and availability of such local labor.

"Charges for ownership and risk allow for responsibility of ownership and such factors as field conditions and skill of the operator. The charges for machine cost and labor will be largely beyond the control of both parties but charges for ownership and risk must be determined and may be 25 to 50 per cent of the cost of use with a slight additional charge for profit on labor.

☛ "CUSTOM RATES are equal to actual machine cost, plus cost for labor, plus charge for ownership and risk. Additional charges for twine, bale ties, etc., must be agreed upon by local custom.

"It would seem that by using the College Farm Service equipment costs and adding your own local labor costs, plus 25 to 50 per cent additional charge for ownership and risk, a fairly equitable custom fee could be determined.... 'The College Farm Service equipment costs are secured from actual experience in farm operation and they should be entirely reliable since labor is considered an independent factor and does not affect the actual cost of machine operation."

The final column in the table below is based on the approximate unit cost of work done under favorable conditions, labor at 85 cents per hour, and allowing 25 per cent for cost of ownership and risk.

All quotations are from "Farm machinery custom and rental rate computations, suggestions for adaptation of (Iowa Bulletin) P-37 to local conditions."

The rental schedules suggested on this page are based on the Jan. 1, 1948 schedules of Iowa State College Farm Service, the farm operating department at Ames, Iowa, This schedule takes into account equipment charges as well as size of equipment.

1948 FARM MACHINERY RENTAL RATE

Based on College Farm Service Rates, Iowa State College, Ames, Iowa

OPERATION	Cost of Using Farm Machinery	Approximate Unit Cost[1]	Reasonable Custom Rate[2]
TILLAGE[5]			
Plowing - moldboard plow, average depth (about 6 inches)	$1.50 - acre	-	-
1-bottom plow	1.50 - "	$3.20 - acre	$4.00 - acre[4]
2-bottom plow	1.50 - "	2.35 - "	2.94 - " [4]
3-bottom plow	1.50 - "	2.00 - "	2.50 - " [4]
Disk harrow, 10 foot tandem	.50 - "	.80 - "	1.00 - "
Drag harrow, 20 foot section	.30 - "	.50 - "	.63 - "
Packing, corrugated roller	.40 - "	.70 - "	.88 - "
PLANTING[5]			
Drilling small grain - 10½ foot	$ .55 - acre	$ .85 - acre	$1.06 - acre

1948 FARM MACHINERY RENTAL RATE

OPERATION	Cost of Using Farm Machinery	Approximate Unit Cost [1]	Reasonable Custom Rate [2]
PLANTING (cont.)			
Fertilizer drill, seeding and fertilizer application combined	.85 - acre	1.25 - acre	1.56 - acre
Seeding alfalfa, clover, brome, etc., cultipacker, seeder	.50 - "	.80 - "	1.00 - "
Planting row crops - 4 row drill	.60 - "	.80 - "	1.00 - "
- 2 row drill	.85 - "	1.25 - "	1.56 - "
Planting corn - checkrow, 4 row	.85 - "	1.15 - "	1.44 - "
" " - drilled, 4 row fertilizer	1.00 - "	1.40 - "	1.75 - "
CULTIVATION [5]			
Weeder - 14 foot	.35 - acre	.55 - acre	.69 - acre
Shovel cultivator - 2 row	.60 - "	1.05 - "	1.31 - "
HARVESTING [5]			
Corn picking - 2 row picker	$3.00 - acre	$3.50 - acre	$4.37 - acre
Hauling from field and elevating or binning	.02 - bu.	.04 - bu.	.05 - bu.
Combining - direct	2.75 - acre	3.50 - acre	4.37 - acre
Windrowing grain	.85 - "	1.35 - "	1.69 - "
Combining - pickup	2.75 - "	3.50 - "	4.37 - "
Ensilage, field harvester	4.00 - "	5.00 - "	6.25 - "
Haul, elevator, and pack silage	.50 - ton	1.05 - ton	1.31 - ton
Forage harvester, grain silage, field cutter	3.00 - acre	4.00 - acre	5.00 - acre
Shelling corn. Does not include transportation	.03 - bu.	.04 - bu.	.05 - bu.
HAYING [5]			
Mowing hay	$ .60 - acre	$1.05 - acre	$1.31 - acre
Raking hay - side delivery	.50 - "	.80 - "	1.00 - "
Loading in field, hauling and unloading loose hay	2.00 - ton	2.45 - ton	3.06 - ton
Baling - one man field baler including wire or twine	.08 - bale	2.75 - ton	3.44 - ton
Picking up, hauling and storing bales	1.25 - ton	2.25 - "	2.81 - "
MISCELLANEOUS [5]			
Bore post holes 9" diameter x 30" depth.	$ .05 - hole	$ .15 - hole	$ .19 - hole
Spray weeds, fence rows, etc. chemical weed control with power sprayer	.75 - hour	1.60 - hour [6]	2.00 - hour [6]
Spray weeds with 2-4-D in row-crops 6-row sprayer	1.00 - acre	2.25 - acre [6]	2.81 - acre [6]
Spray building with DDT	.75 - hour	2.50 - hour [3]	3.12 - hour [3]

---

[1] Unit costs based on favorable working conditions and includes labor at 85 cents per hour - Iowa State College Data.

[2] Reasonable custom rate equals unit cost plus 25 per cent to cover ownership and risk-- Doane estimates.

[3] Includes cost of DDT.

[4] In actual practice custom rates for plowing with various sizes of equipment are about the same.

[5] The rate shown includes the tractor and (or) truck.

[6] Includes cost of 2-4-D applied at rate of ½ pound active ingredient per acre.

MOTOR OIL BUYING GUIDES

Proper lubrication has always been the most important factor determining the life of a car, truck or tractor engine. Recent engine developments have made buying the right motor oil more important than ever.

HIGHER COMPRESSION engines, now common in most farm tractors, have made oil's job much more difficult. Higher compression ratios increase the temperatures and result in bearings carrying much heavier loads.

CLOSER TOLERANCES between the moving parts mean that thinner oil films must bear shock and heat without breaking down.

MORE REVOLUTIONS per minute also increase the load thrown on the lubricating oil.

FARM DIESELS demand a superior lubricating oil. Extremely high compression ratios, the possibility of sulphur in the fuel and high bearing loads add up to the necessity for top quality oil.

PURPOSE OF OIL

Before determining the best oil to buy, we must understand just what oil must do.

Lubrication or reducing friction is the most important function motor oil must perform. By doing this properly there will be less wear and the engine will get more actual work from a gallon of fuel.

Cooling -- Water or air does the major job of cooling the engine, but in certain places heat can't be transmitted to a water jacket. These parts are the top of the piston, crankshaft and rod bearings and wristpins. Oil must carry the excess heat away from these parts.

Sealing of the combustion chamber. The piston rings are most important. But oil makes the final seal which prevents gases from blowing by the rings down into the crankcase.

Cleaning of the engine. Oil picks up pieces of carbon, dirt, dust and other particles as it circulates through the engine. These are carried to the crankcase or oil filter. One of the primary reasons for periodical oil changes is to remove these contaminents from the engine.

These functions impose heavy burdens on the oil used. High temperatures tend to cause oxidation which thickens the oil and builds up corrosive acids.

ADDITIVES

The heavy strain placed on motor oil by modern engines has made it necessary for refiners to add various "additives" to motor oil for certain type services. These "additives" are rather complex and confusing to many. Here are some of the more common ones used:

√ Antioxidant -- Increases the resistance of oil to oxidation, which thickens it.

√ Anticorrosive -- Decreases or prevents corrosion of metal parts by oil.

√ Film strengthener -- Increases the strength of the oil film.

√ Foam Depressant -- Prevents oil from foaming in the crankcase.

√ Detergent -- Promotes engine cleanliness.

√ Dispersant -- Suspends deposits in oil stream for easy removal.

Some additives are in almost all motor oils. Detergents and dispersants are usually added only to the higher-price oils and are generally called detergent oils.

OIL CLASSES

The old system developed by the American Petroleum Institute had the following classifications:

- REGULAR TYPE. Oil suitable for use in internal combustion engines under moderate operating conditions.
- PREMIUM TYPE. Motor oil having the oxidation stability and bearing corrosion preventative properties necessary to make it suitable for engines where operating conditions are more severe than for regular duty.
- HEAVY-DUTY TYPE. Motor oil having the oxidation stability, bearing corrosion preventative properties, and detergent-dispersant characteristics necessary to make it suitable for use in both high-speed diesel and gasoline engines under heavy-duty service conditions.

Some motor oil is still using these classifications. However, the new system is more specific and gives much more guidance in determining the best quality oil to use.

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MOTOR OIL BUYING GUIDES

The New American Petroleum Institute classification is based on the type of engine, the kind of service and the nature of the fuel used.

The two basic engines considered in the classification are:

The code letter "M" identifies motor oils used in gasoline, LP-gas or other spark ignition engines. The letter "D" identifies motor oils used in diesel engines.

KINDS OF SERVICE

→ **Service ML**

This service includes passenger car and light truck driving on the farm, and from farm to market. Many farm tractors and power units can be satisfactorily lubricated with ML oils. This oil is also used for outboard motors and 2-cycle washing machine and lawn mower engines.

→ **Service MM**

Automobiles for business and pleasure, most farm tractors, farm trucks, light delivery trucks, spark ignition engines used on combines, hay balers, forage harvesters and water pumps should perform reliably on MM motor oils.

→ **Service MS**

This is the most severe service encountered in the operation of spark ignition engines. All gasoline and LP-gas commercial and farm trucks making long trips or hauling heavy loads will need oils meeting Service MS requirements.

So will private and commercial automobiles, taxicabs and light delivery trucks, doing start-and-stop, short farm to market or around town driving or prolonged operation at low-engine temperatures.

Farm tractors doing chore work in winter or operating in very severe working conditions should use MS oils. Automobiles with hydraulic valve lifters should use motor oils meeting the Service MS requirements.

→ **Service DG**

Most farm and track-type tractors equipped with diesel engines can be lubricated with motor oils meeting Service DG classification. So can diesel engines used in stationary service to power small generators, refrigerated locker plants, feed mills or irrigation pumps.

→ **Service DS**

This is the most severe service. If your diesel engine has a supercharger, the manufacturer will quite likely recommend oils for Service DS. In general use DS oils if the sulphur content of the fuel exceeds .4 percent.

Some oils will qualify for more than one service classification. One might qualify for service MS and DG. Containers are marked for the most severe service recommended.

Do not use oils classified for Service DG and DS in gasoline engines unless the manufacturer recommends them.

VISCOSITY NUMBERS

Viscosity describes the fluidity of an oil. The lower the number the thinner or lighter the oil; the higher the number the thicker or heavier the oil.

SAE 10W and SAE 20W oils are specially developed to flow easily in cold weather. Most farm tractors require SAE 20 or 30 for summer work, SAE 10W and SAE 20W for winter operation. Your instruction manual will give specific instructions for various weather conditions.

FUEL AND OIL DOPES

Many fuel and oil "dopes" are available. Some are put in the gas tank, others in the crankcase. Iowa State College states in pamphlet 186, "In general, fuel dopes in small quantities don't do very much harm or very much good. The United States Bureau of Standards reported recently that in its testing of more than 150 fuel dopes, none of them showed any important improvement in engine performance. Some dopes used represent an unnecessary expense to the operator.

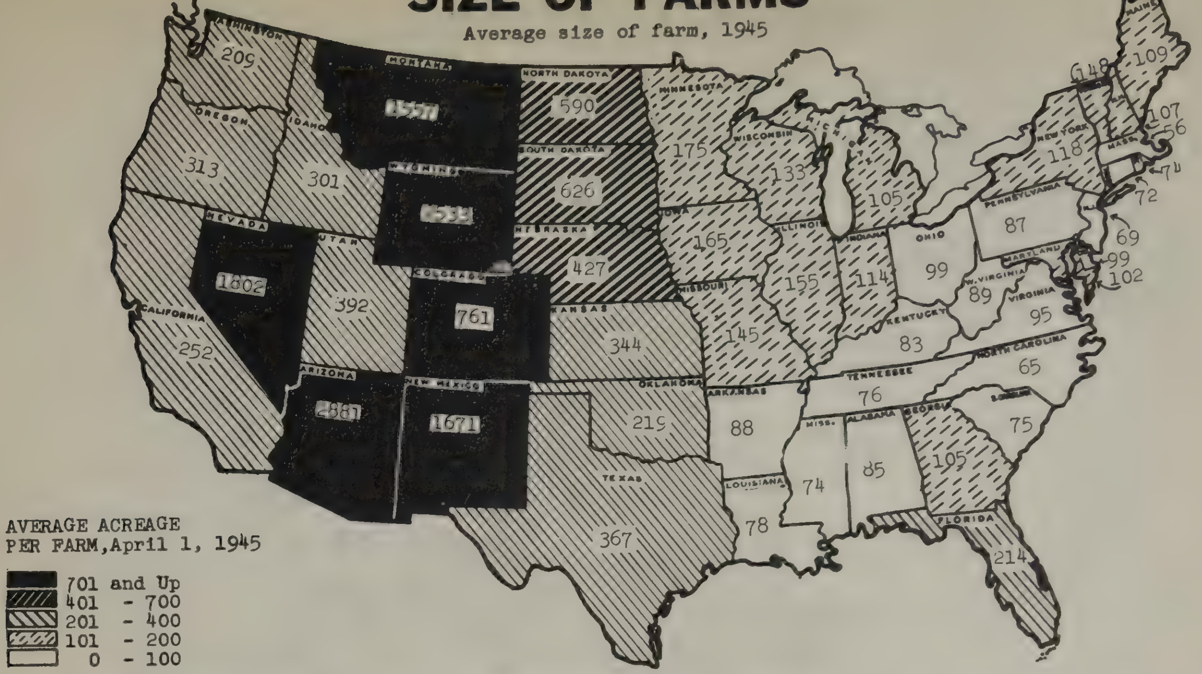
"On the other hand, motor oil dopes which are used in the oil in the crankcase may not only serve no useful purpose, but in many cases may be actually injurious, particularly where Service MM, MS, or DS motor oils are in use.

"Some of these dopes have been found corrosive to hard metal bearings. Others upset the chemical balance in the oils and may cause serious lubricating problems. Modern motor oils contain balanced chemicals which will do all the things the manufacturer of an oil dope claims his material will do. Modern motor oils have been tested in engine service."

References: Circular 589, University of Illinois; Pamphlet 186, Iowa State College; Gulvin, Farm Engines and Tractors, McGraw-Hill, 1953.

SIZE OF FARMS

Average size of farm, 1945



The war accelerated many changes in agriculture which had been developing slowly over a long period prior to 1940. Middle-sized farms are becoming obsolete in many areas and are now subject to pressure from both large and small farms. The map above does not tell the whole story because rapid increase in the number of very small units has tended to offset the trend to large farms.

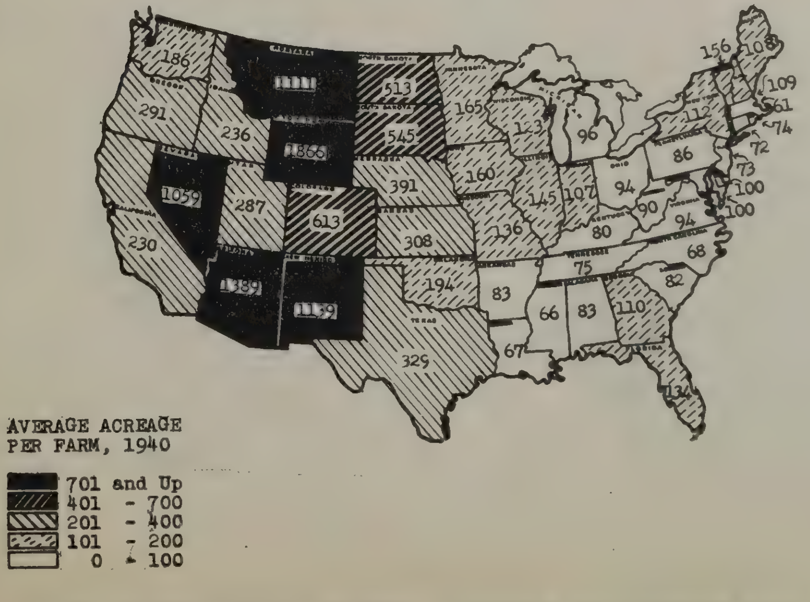
In some of the highly industrial areas of the east, the increase in the number of small farms has more than offset the increase in the size of the large unit. A total of nine states in New England and along the eastern seaboard show a net decrease in the average size of farms. Similar trends are apparent around the large industrial areas, even in the midwest.

The average size of farms in southern states is relatively small due to the fact that the land operated by each "cropper" is counted as a farm even though it is a small part of a plantation under one management.

Farms of 200 to 320 acres are of efficient size for Corn Belt conditions. Farms under 160 acres are often limited in operating possibilities unless they are specialized properties.

A small farm business seldom shows satisfactory profits because the most effective use cannot be made of modern farm machinery, and the proportion of the total income required to maintain the operator and his family and to pay fixed charges is large. In periods of normal business activity, the size of the business is one of the chief factors governing the financial return to the farm operator.

AVERAGE SIZE OF FARM
1940



Farms of excessive size have limitations such as the following which reduce the profitableness of their operation under average conditions:

1. Units above family size require hired labor, which is often less efficient.

2. The operator is able to give less detailed attention per unit.

3. There is a relatively smaller volume of business per acre.

4. Cash costs for labor are high.

Very small farms have such limitations as the following:

1. Modern machinery is not effectively used.

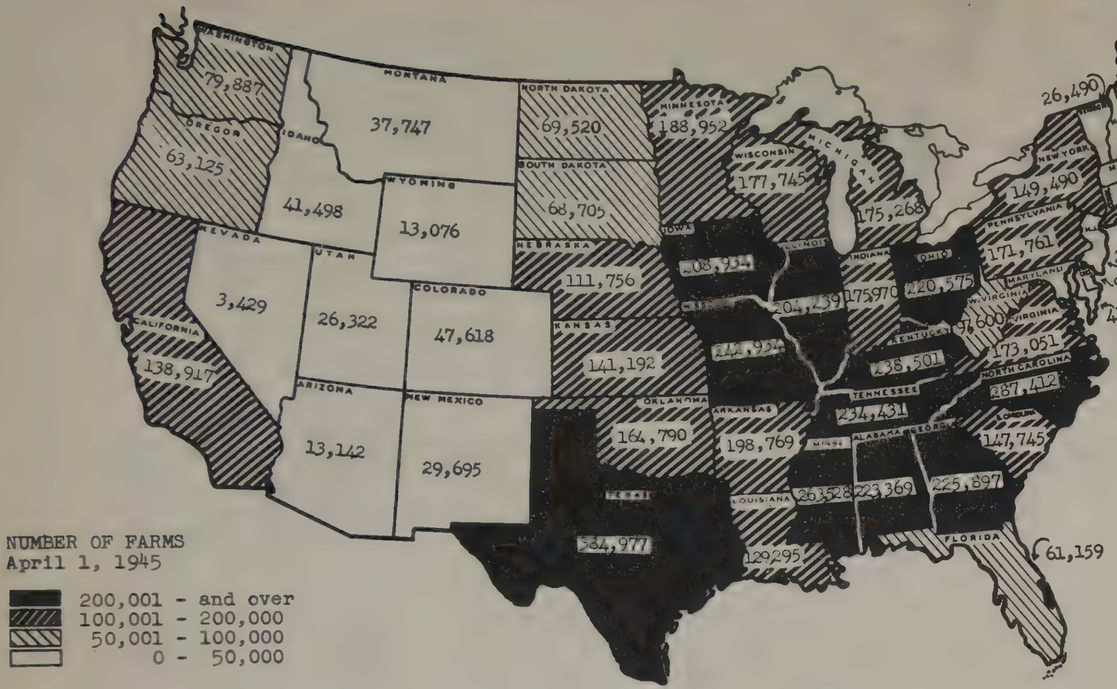
2. A smaller increase for labor and management accrue to owner and operator.

3. In times of depression the income may barely meet family necessities. Fixed costs such as interest and taxes may go unpaid.

The greatest possible extremes of intensive and extensive types of farming are found in the United States. Each type has practical size limitations which should be observed if farm operations are to be profitable.

NUMBER OF FARMS

Number of farms, 1945

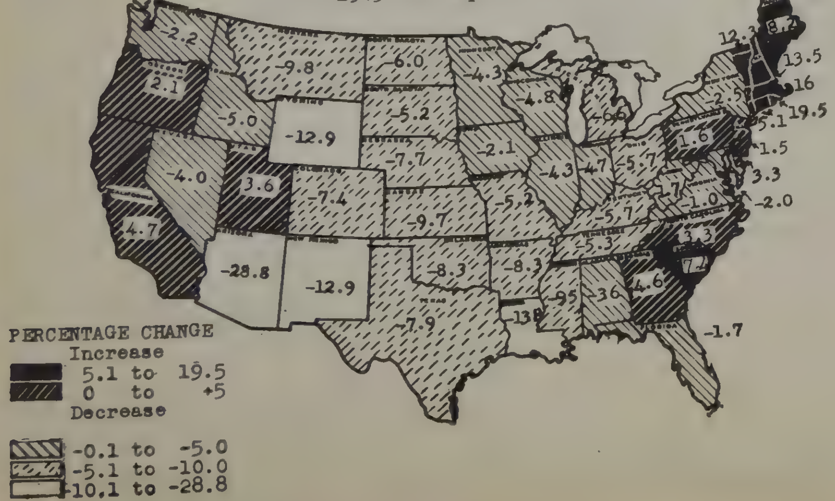


There were 5,858,169 farms in the United States at the time the 1945 census was taken. This number is down 138,620 units from 1940. However, during this same period, small farms of less than 10 acres increased from 501,958 to 590,266 or more than 88,300 units, and large farms of more than 500 acres increased from 264,222 to 286,676 or more than 22,450 units. These are increases of 17.6 and 8.5 per cent respectively.

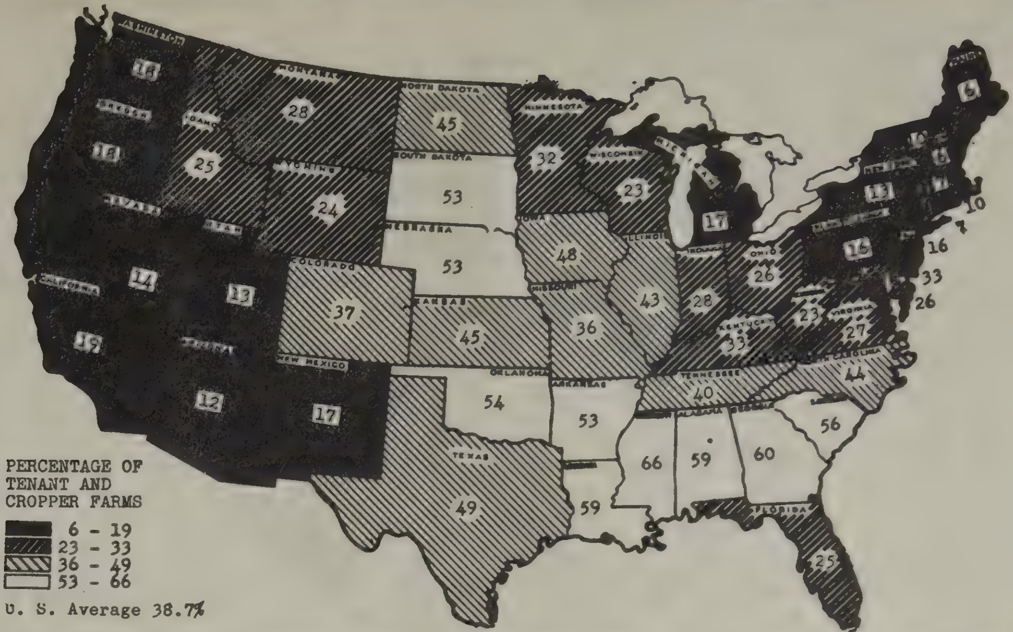
The rapid increase in the number of small farms (tracts under 10 acres) is of national significance, because commercial farmers cannot pay as high a price for land as the small part-time farmer. Commercial farmers must depend on the income from their farm operations to pay for the land and support their family. The part-time farmer, on the other hand, depends on outside income for his living and values his farm investment in terms of the dollars he can save by growing his own food as compared to buying it at retail in the market. Usually his concept of value is based on the sale price of real estate in town. The small part-time farmer is buying a home, but the commercial farmer is buying a business. In many respects these small farms are not unlike the small holdings of the peasant classes of Europe and the small farmers of the Orient. This suggests the possibility then that the "man with the hoe" may yet displace our efficient mechanized farmers. However, this is looking far into the future.

Middle-sized farms are being subdivided into smaller units or are being combined with other farms to make possible a larger volume of business for the large operator. This is not an unmixed blessing, but one which is the result of forces now prevailing in our economy. The mechanization of power has been the principal factor that has made this trend possible. The war, the shorter work week, uncertainties of employment, and inflation, plus the natural desire for a "little place in the country", all have contributed their part. The automobile puts a part-time farmer within minutes of his job and the farm tractor has made practical the handling of larger and larger acreages under one operation. The trend to large farms was especially evident during the period 1940-45 because during the war years, farmers were forced to seek ways to hold up production in the face of an ever declining labor supply.

PERCENTAGE CHANGE IN THE NUMBER OF FARMS
1945 As Compared with 1940



TENANT AND CROPPER FARMS



The figure in each state on the above map shows the average percentage of tenant-operated farms within that state. These figures also include croppers, who "depend on their landlords not only for land but also for the workstock and equipment with which to farm that land and often even for food and feed while making their crop."

The percentage of tenant-operated farms is relatively high in most areas where major cash crops are largely grown. Tenancy is inclined to be distinctly lower in areas of less productive soils and where subsistence types of farming are important. Areas in which dairying, livestock production, and fruit and vegetable growing are major farm enterprises usually have fewer tenants, as such operations are more complicated, and success with these enterprises requires permanent tenure.

The highest percentage of tenancy is found in the Cotton Belt, particularly in the more fertile areas where much of the cotton is produced with the use of croppers. The ease with which cotton land is rented and rents collected, and the many side income features of financing or "furnishing" tenants and croppers, has encouraged absentee ownership in the Cotton Belt. Merchants, cotton brokers, bankers, and others often own land as a means of controlling store trade, lending money, or controlling the marketing of crops.

Although the rate of tenancy in the cotton and tobacco areas of the South has been and is highest, severe declines in the proportion of tenant-operated farms have occurred in the states of this general area in the last decade. Proportional increases in tenancy occurred in states outside the South, notably North Dakota, South Dakota, and Nebraska.

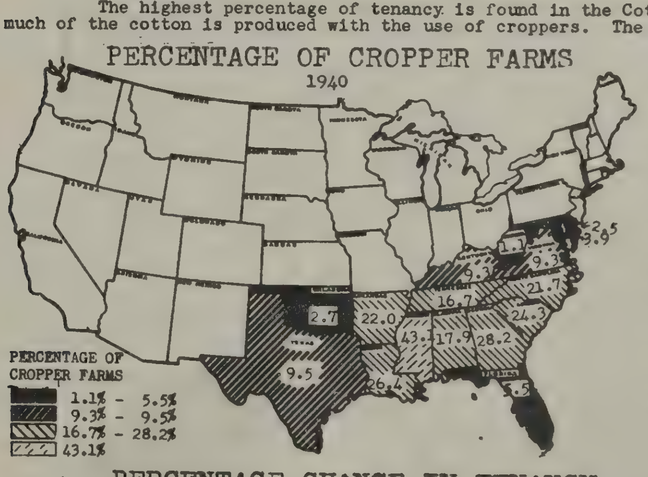
Well-established tenant systems are a definite and permanent part of the agricultural industry. This is particularly true in the more productive farming areas where tenancy increases faster. The reasons for tenancy are many and varied. Two of the most frequently advanced are:

1. High-priced land which farmer-operators are unable to buy because of insufficient capital, and
2. Increased taxes which reduce the net returns from farm ownership.

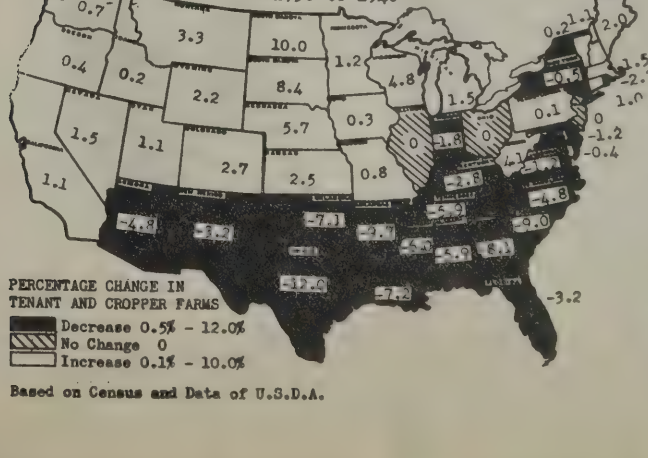
The recent agricultural depression is sometimes blamed for the large proportion of farm tenancy, but the 1920 census (the year starting the farm depression) showed 38.1 per cent tenancy for the United States or only .6 per cent less than in 1940 and 4.3 per cent less than in 1930.

Although owner operation of farms is highly desirable there are well developed, stable farming areas where farms are very satisfactorily operated on a tenant basis. In many such areas, land values, crop yields, income and other economic factors are higher than for adjoining regions of high ownership. A community or state cannot be properly judged by the percentage of tenancy alone. Well controlled operation by high-type tenants is more desirable than poor, inefficient operation with less desirable owners.

PERCENTAGE OF CROPPER FARMS
1940



PERCENTAGE CHANGE IN TENANCY
1930 to 1940

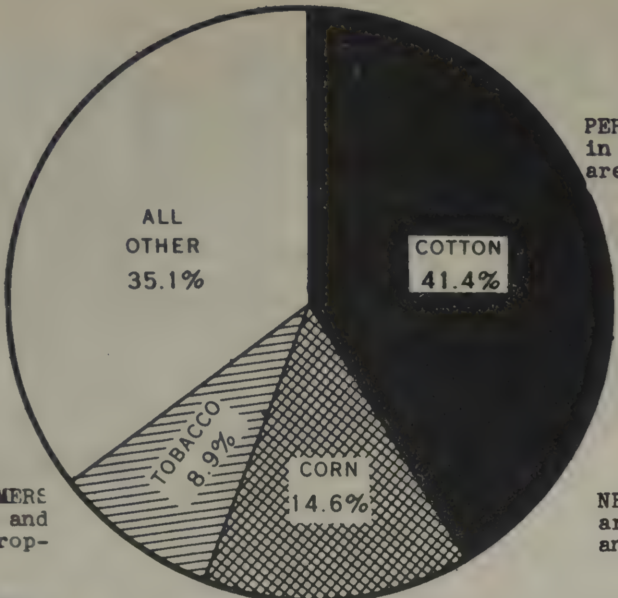


Based on Census and Data of U.S.D.A.

MOST TENANTS ARE IN THE COTTON BELT

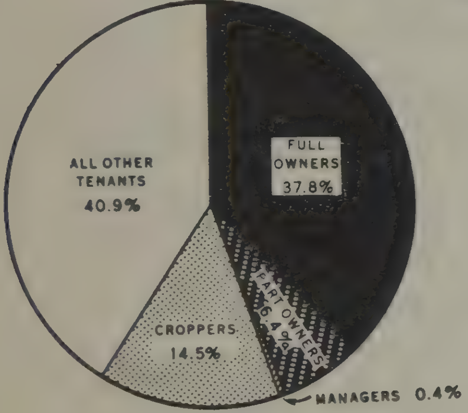
THESE GRAPHS SHOW

1. Distribution of all U.S. tenants by various type-of-farming areas. See the large graph.
2. The contrast between White and Negro tenure in the Cotton Belt. See the two top small graphs.
3. The contrast between the tenure of all Cotton Belt farmers and Corn Belt farmers. See the two small graphs at bottom of page.

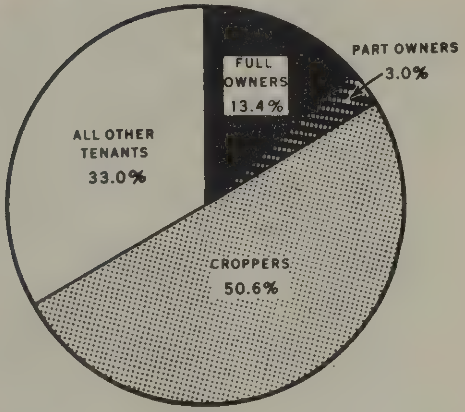


PERCENTAGE OF ALL TENANTS in various type-of-farming areas.

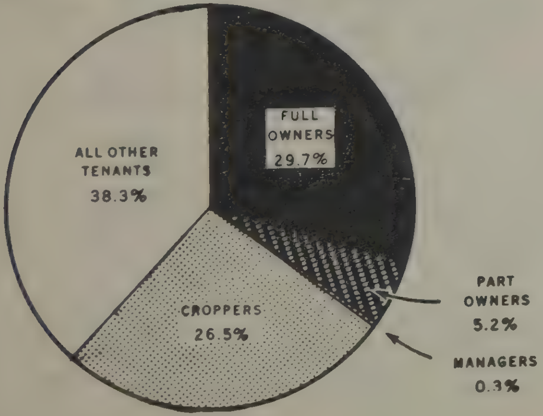
WHITE COTTON BELT FARMERS are 44 per cent owners and less than 15 per cent croppers.



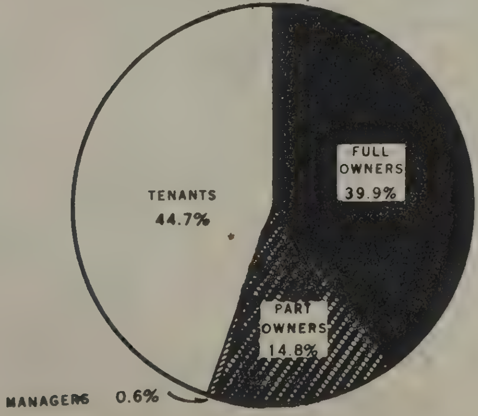
NEGRO COTTON BELT FARMERS are 50 per cent croppers and 16 per cent owners.



COTTON BELT FARMERS are 65 per cent tenants and croppers.

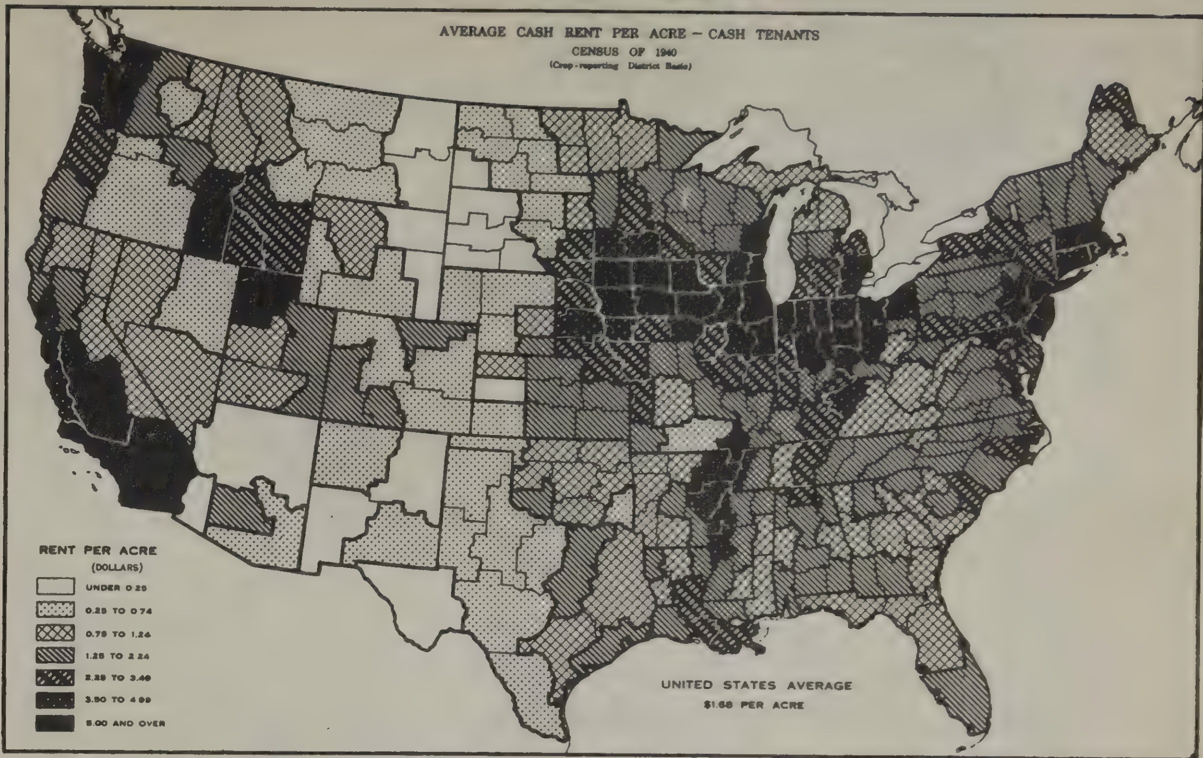


CORN BELT FARMERS are about 45 per cent tenants - no croppers.



Graphs from U.S.D.A. 1935 Census Data

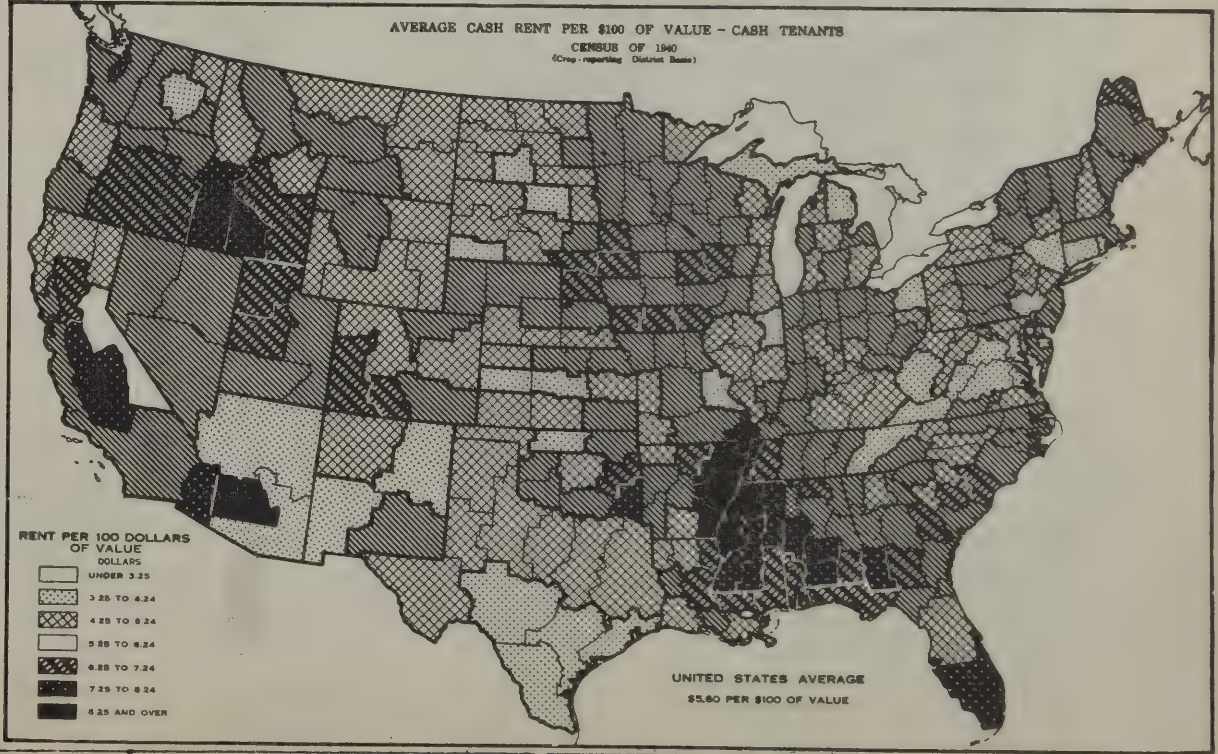
CASH RENTS



AVERAGE CASH RENT PER ACRE – CASH TENANTS
CENSUS OF 1940
(Crop-reporting District Basis)

Cash rents as shown in these maps represent the gross amount paid to the land owner. They do not take into consideration the contributions made by the landlord, which vary greatly from area to area, such as: Management, Financing, Building repairs, Irrigation water, Taxes, and Other perquisites.

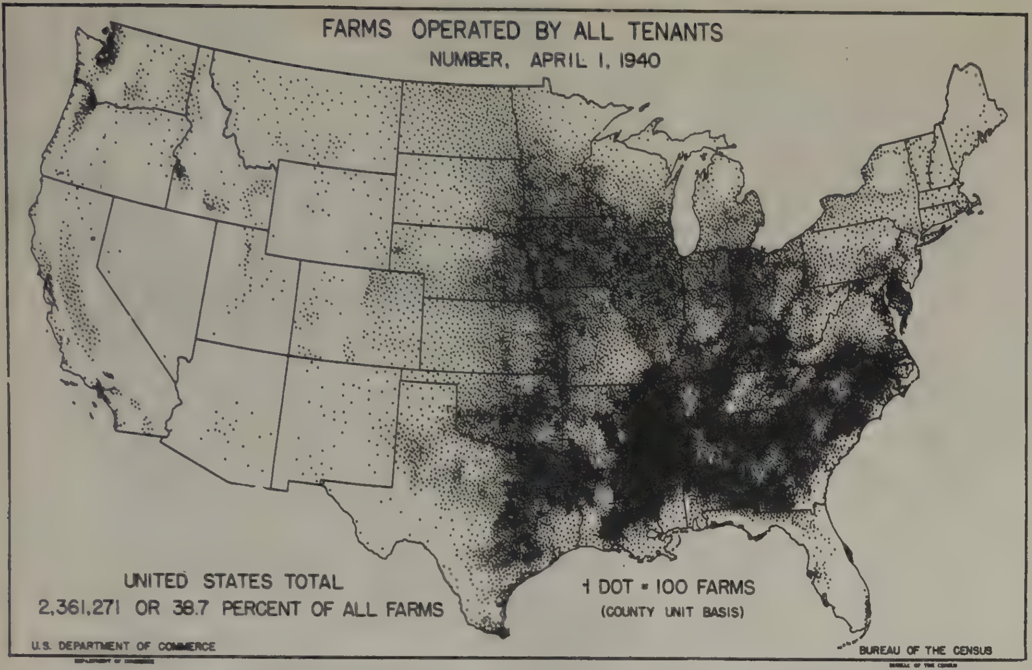
For this reason the reported level of cash rents is not directly comparable from one area to another. Rental arrangements, however, are similar over wide areas and the averages shown can be used as a guide when these limitations are given proper consideration.



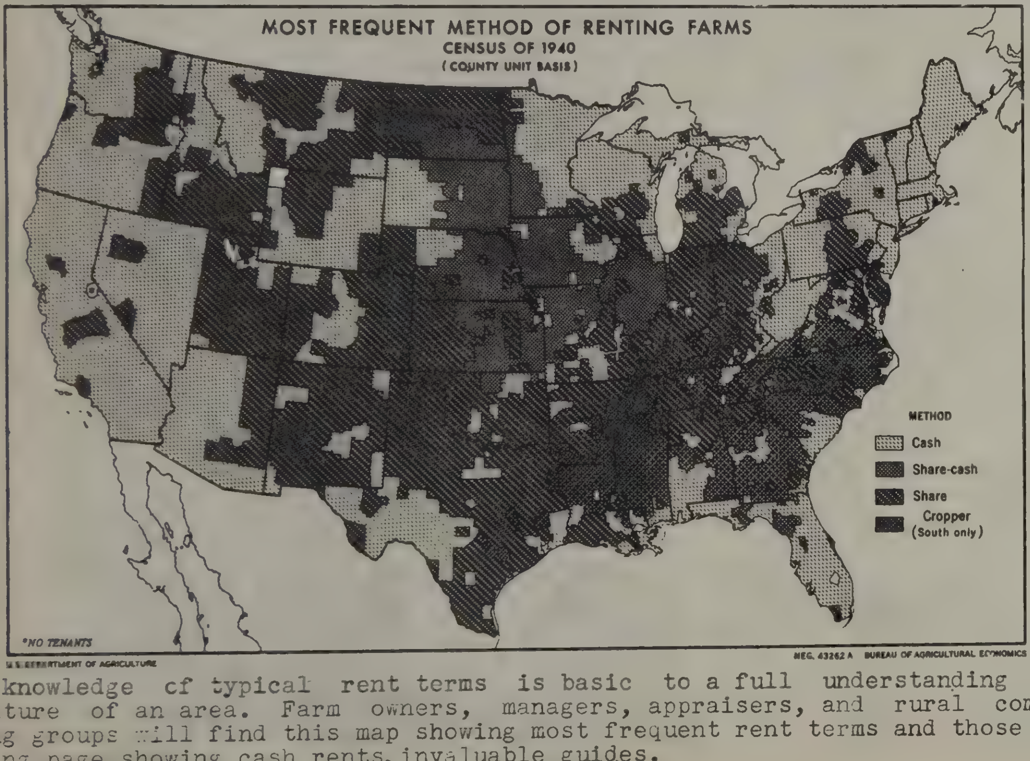
AVERAGE CASH RENT PER $100 OF VALUE – CASH TENANTS
CENSUS OF 1940
(Crop-reporting District Basis)

Maps from the Bureau Of The Census & Bureau Of Agricultural Economics

FARM TENANCY



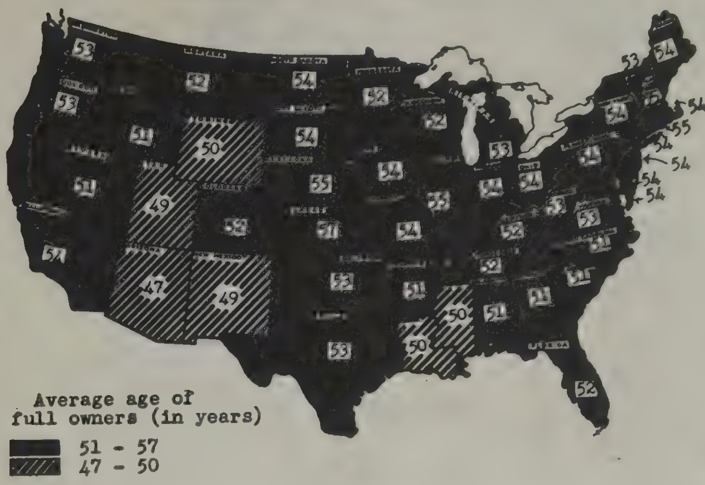
Farm tenancy is an essential part of the American system. Just as the average city dweller rents his home and works in a factory owned by others, many farmers find that they can invest their time and money most effectively in operating capital rather than in farm real estate yielding only 4 or 5 per cent per dollar invested.


MOST FREQUENT METHOD OF RENTING FARMS
CENSUS OF 1940
(COUNTY UNIT BASIS)
METHOD
▨ Cash
▨ Share-cash
▨ Share
▨ Cropper (South only)
*NO TENANTS
U.S. DEPARTMENT OF AGRICULTURE
NEG. 43262 A BUREAU OF AGRICULTURAL ECONOMICS

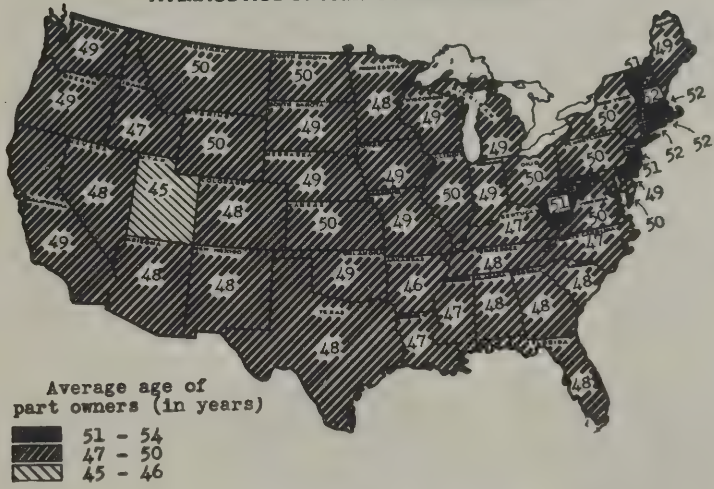
A knowledge of typical rent terms is basic to a full understanding of the agriculture of an area. Farm owners, managers, appraisers, and rural community planning groups will find this map showing most frequent rent terms and those on the preceding page showing cash rents, invaluable guides.

AGE OF FARM OPERATORS

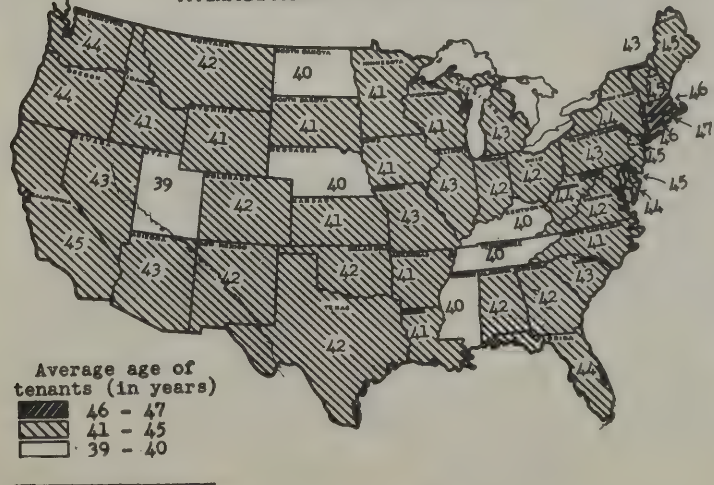
AVERAGE AGE OF OWNER OPERATORS



AVERAGE AGE OF PART OWNER OPERATORS



AVERAGE AGE OF TENANT OPERATORS



Based on 1940 Census

AGRICULTURAL LADDER

The age of farm operators and their position on the "agricultural ladder" are very closely related. The data shown here represent only three rounds of the total of six in the complete ladder.

The first two rounds are easy and represent a period of apprenticeship. The typical farm lad starts at the bottom by working with his father or neighbors and learns from them.

A few years later he takes the second round and becomes a hired man. If he is wise, he will go to work for a leading farmer in a good farming area, and learn good management methods first hand. During this period he saves his money and prepares to take the next step.

The third round is more difficult and requires a certain amount of risk. As a farm tenant the young farmer is on his own for the first time. He invests his savings in equipment and livestock while maintaining an operating reserve. Usually, he requires help with his finances at first, because in the better farming areas it takes several thousand dollars to get started as a high-class tenant.

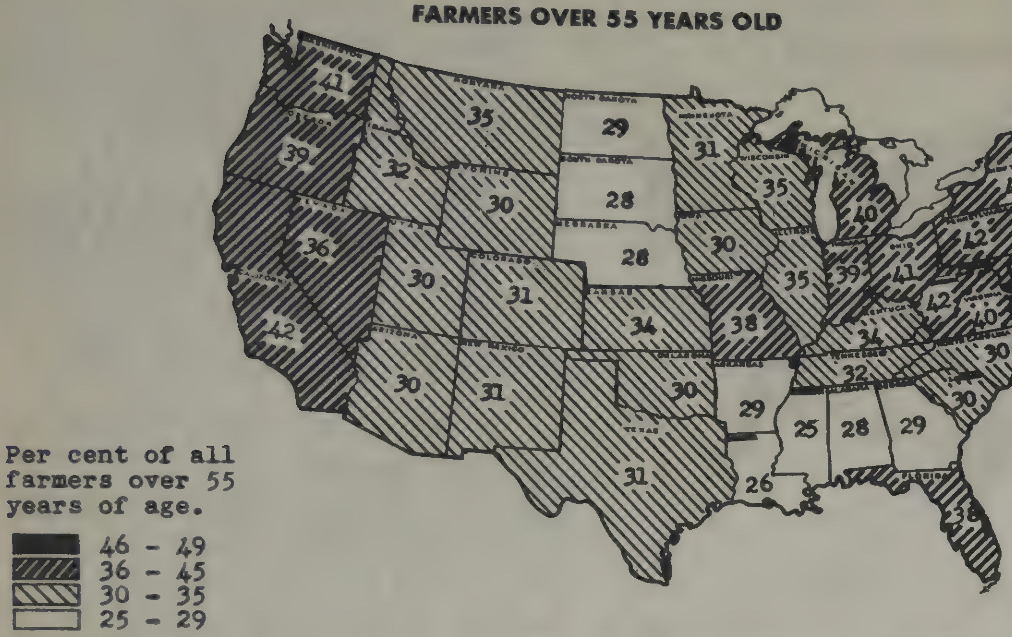
Many farm operators never climb higher than the third round. Some do not save enough to advance, while others prefer to keep their money working as operating capital because with their managerial ability, it will earn more in this way than when invested in farm real estate. It is usually during this period that the farm operator rears his family and makes preparation for his old age. The best years of an average farmer's life are consumed in accomplishing these multiple goals. This is evidenced by the fact that the average age of all tenants was 41.5 years in 1940.

The fourth round is relatively easier than the third as it is a process of growth. The tenant operator can become a part owner just as soon as he accumulates a safe cash reserve, after paying for his livestock and equipment. The average age of part owners was 48.8 years in 1940, indicating that it takes about 7 years to go from the third to the fourth round in the agricultural ladder.

Full owner operation, the fifth round, is the goal of most farmers and it requires the greater part of the productive life of most farmers to attain it. Many try to short cut by buying the farm earlier in life with borrowed money but in doing so they mortgage the farm and the future of themselves and their families. If the price cycle is favorable and there is superior management, it can be successful. Reverse conditions make these short-cuts extremely costly to farmers and their families. It requires an average of about 4 years to pass from the status of part owner to full owner, as is indicated by the fact that the average age of full owners was 52.8 years in 1940.

The sixth round of the "agricultural ladder" is represented by the retired farm owner. By the time full ownership is achieved most farmers are approaching retirement age. It is significant that in 1940 the average age of owner operators in 35 states equaled or exceeded 52 years which was the average retirement age of all farmers following the first World War. Many of these aged operators are still active because of the urgent war demand for food, but after the war they will retire rapidly.

AGE OF FARM OPERATORS



This map reveals the relative need for replacements in agriculture following the war. Returning veterans and war workers who wish to go back to a farm can use this map as one of their guides. Businesses serving agriculture will find such data a valuable index to the extent of the changes in personnel with which they will be dealing in the future.

At the end of the first World War the average retirement age of all farmers was 52 years. A similar experience is probable after the present war, and the opportunities for prospective farmers will be in more or less direct proportion to the number of farmers now in the advanced age groups. There are now many more old farmers on farms than ever before recorded. In 1940 2/5 or over 40 per cent were past the average retirement age, and the proportion has since increased.

The industrial north-eastern part of the nation and the Pacific Coast offer relatively greater post-war opportunities for prospective farmers than other areas. The Cotton Belt and the Northern Wheat Belt stand out as regions of limited opportunity after the war based on the factor of age of farmers.

The actual number of openings in agriculture, however, will be below the proportion indicated on this map because of technological advancements which have occurred in the last 10 years and are anticipated after the war. As old farmers retire, many small farms will be combined or incorporated with larger units to more efficiently use new machinery and equipment.

This trend will be most noticeable in the South. If economic forces are given free sway many of the small units now characteristic of the area will be absorbed. It may be that this development will practically erase even the limited replacement opportunities which now seem to exist in the area. Similar trends, though less drastic, are in progress in all sections of the nation.

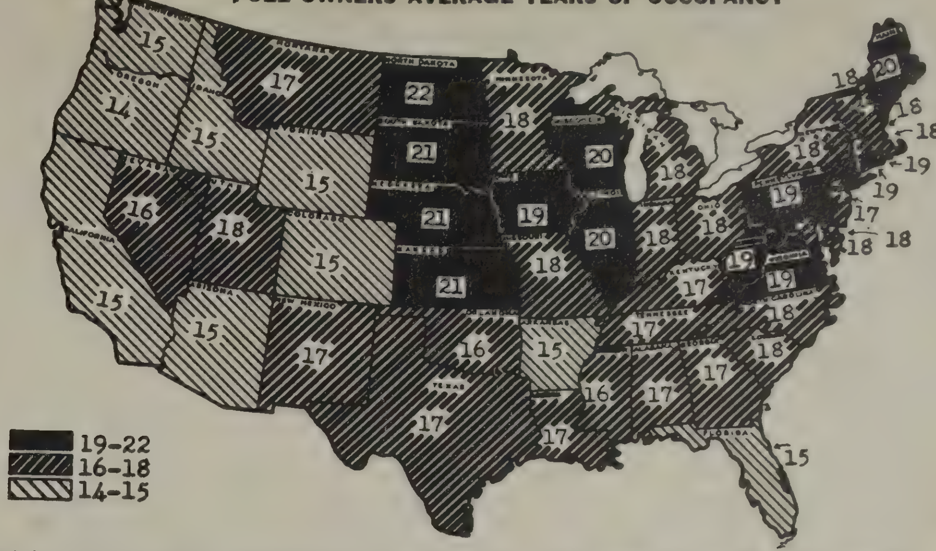
The New England states offer fewer opportunities than the data indicates. This section of the country will face increasingly keen competition from the Mid-West. Every improvement in transportation and processing serves to strengthen this competition.

The Corn Belt, the Ranch Area, and the Pacific Coast will be less affected by these developments than other areas. These regions offer greater opportunities relative to the indicated replacement needs than most other sections of the nation.

Based on 1940 Census

OWNERSHIP ENCOURAGES PERMANENT OCCUPATION

FULL OWNERS AVERAGE YEARS OF OCCUPANCY



Ownership encourages permanent occupancy and is often the fruit of long tenure.

The corn belt and northeastern dairy belt are areas of long tenure. The cost of buying and equipping a farm is higher there than in some other regions, but the operating surplus is sufficient to accumulate the capital reserves necessary to purchase land.

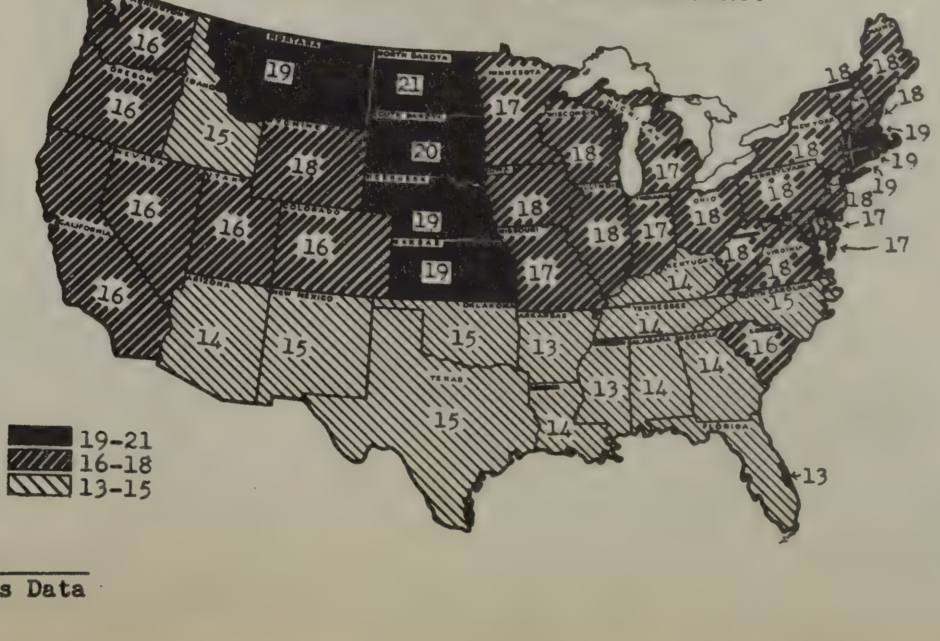
The Northern Great Plains also rank high regardless of the repeated droughts and crop failures.

The cotton belt is notably a region of short tenure. Tenancy is more common in the south (See page 421) than in the other major farming areas.

The Mountain and Pacific states in general are intermediate in length of tenure between the southern and northern states. This section of the country is still young with continued pioneering in progress.

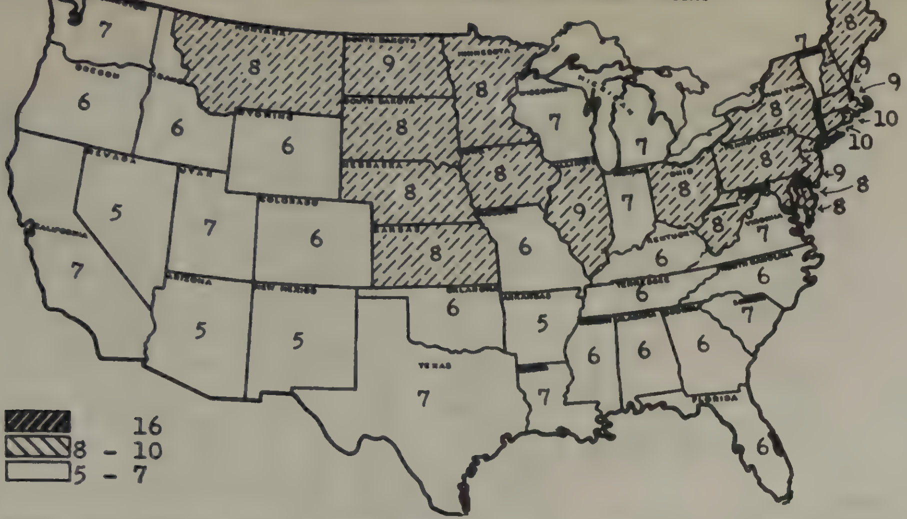
On April 1, 1940, nearly one out of every five or 17.8 percent of all operators had been on the farms then occupied less than 15 months. This indicates that approximately 10 percent or one out of every ten farmers move each year.

PART OWNERS AVERAGE YEARS OF OCCUPANCY



1940 Census Data

TENANCY-NUMBER OF YEARS ON SAME FARM



Tenants move more frequently than owners. On January 1, 1935, only 10% of the owner-operators as contrasted to 47% of the tenant-operators had moved to their farms in the last two years. On April 1, 1940, 33% or one-third of all tenants had been on their farms less than 15 months and 16% or one-sixth had moved to their farms within The last 3 months. Croppers move more frequently than other classes of tenants. For 12 southern states 22%, or more than one out of every five croppers moved to their farms within the 3 months prior to April 1, 1940. Over two-fifths or 41% have been on their farms less than 15 months.

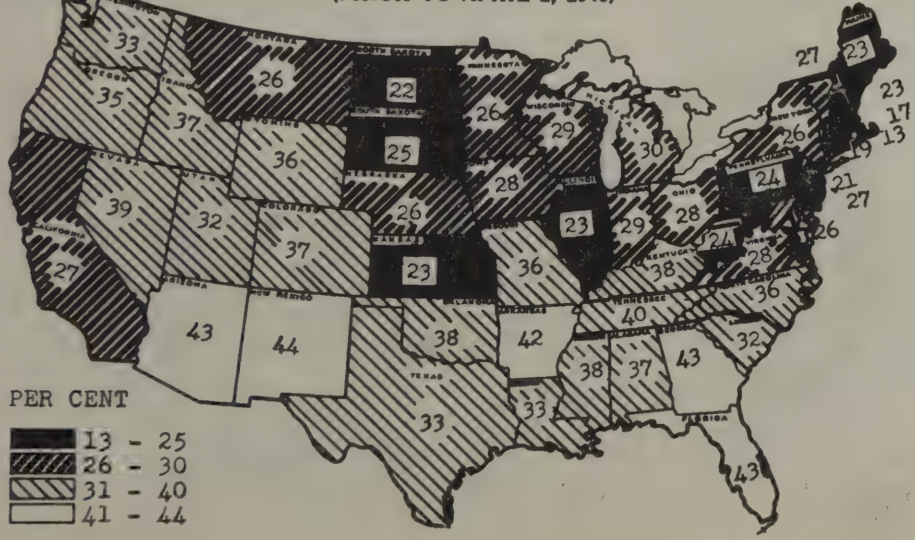
Study of comparable data for 1910 to 1930 shows some very pertinent facts:

1. Distinctly increasing number of older as compared with younger farmers.
2. An increase in tenancy, particularly among farmers of middle age.
3. A general increase in the average period of farm occupancy.

These facts indicate that it is becoming increasingly necessary for a young man who wishes to farm to start as a tenant or cropper.

Stability of tenure is greatly to be desired and is necessary for any community that hopes to obtain a highly developed farm industry. This applies to the period of farm occupancy by both owners and tenants. Much more permanancy in both classes is needed.

PER CENT OF TENANTS ON SAME FARM, FIFTEEN MONTHS OR LESS
(PRIOR TO APRIL 1, 1940)



FATHER-SON FARM BUSINESS AGREEMENT

The problem of arranging for the continuous ownership and operation of a farm by the members of the same family is complicated by the fact that many men are not ready to retire from the active management of their farms when the sons and daughters reach maturity and are preparing to settle into their life work; also many farms are not large enough or productive enough to afford full employment for two men or to provide a satisfactory level of living for two families. Nevertheless there are a goodly number of farms in the Midwest which can be considered two-family farms, at least during the years when a son or other near relative could become established with an owner who is ready to relinquish part if not all of his farming responsibilities. 1/

The sharing of the farm business with a son or other young man is not only a solution of the problem of the young man who is ready to choose farming as his life work, but it also solves the problem facing many experienced farmers who would like to retire from the heavy work of the farm yet do not want to separate themselves entirely from its operation. There is now a large proportion of older men in the farm population—therefore a special need to develop young men for replacements. These young men are available among ex-servicemen, sons in military service, sons who had been helping on the farm during the war, young sons who are just reaching the age where they can carry more business responsibility, and sons of neighbors. 2/

For the young man with a minimum of experience and capital this is one of the better methods, provided he and his father can work together. Such a plan gives the son the chance to become familiar with recent developments in farming and to benefit from his father's experience in the operation of a particular farm. In addition, less capital is needed to get started this way than by any other method. The exact amount of capital needed by the son depends upon the particular arrangement worked out with his father. Most agricultural colleges have suggested agreements which they will gladly furnish to anyone interested. These can be modified to suit particular conditions.

In most of these agreements the general plan is for the son to acquire an interest in the farm personal property as soon as possible. Sometimes this is done immediately if the son has funds. If not, he can give the father a note covering his share, then pay off the note from his earnings. In working out the agreement between the two parties, the son's share of the returns should be based upon the share of capital, labor, and management furnished by him. The division of income could well be made on the basis of the net farm income, i.e., the net returns after each party has been paid for his contributions and after all farm expenses have been deducted from the total farm income. If each party has contributed about equally in so far as time and management is concerned, then the net returns from the farm business could well be divided on a fifty-fifty basis.

The father-son method has the added advantage of maintaining the home farm in a far more productive state than if rented to outsiders. Frequently it also stimulates the father's interest in up-to-date farming. The income of the son depends largely upon the terms of the agreement, the size of the farm business, the productiveness of the soil, and how well he and his father manage the business. 3/

In normal times many father-son farm business agreements begin gradually, the son's share being small at first, but increasing as his labor and other contributions become more valuable. Some sons start by way of 4-H club work, by owning one or more head of livestock or a small acreage of crops. Some start in F.F.A. projects, and others who begin in 4-H club work continue in F.F.A. projects once they are in high school. As the son develops, he frequently becomes an owner with his father in one of the farm enterprises.

With the son's increasing maturity, however, such arrangements should be replaced by an agreement giving him an interest in the entire business. There are a number of reasons why such an agreement is most satisfactory. Interest in the business as a whole will (1) give the son the opportunity to assume broader responsibilities and to attain more financial experience, both of which he should have before he is out of his teens; (2) greatly simplify the problem of dividing items of income and expense; and (3) give the son a more uniform net income from year to year than a single enterprise will give. Then, too, a young farmer who continues to concentrate on one crop or one class of livestock is not likely to study all phases of the business as closely as he would if he had a financial interest in them. Such agreements also make for continuity of ownership and for operation of the same farm in the same family from one generation to the next, thus contributing to the stability, permanence, and wholesomeness of farm and community life.

ESSENTIAL CONDITIONS

Business of adequate size. Farming operations must be large enough and must be so organized as to furnish profitable employment for both father and son if both are to work on the farm. Better farming methods, more livestock, and new enterprises, as well as more acres, may be used to increase the farm income. Altho most "two-man" farms in Illinois include 200 acres or more, a few of the most profitable father-son partnerships are based on intensively developed 140- to 160-acre farms.

Equitable sharing. Father and son should share in the net earnings in proportion to their contributions to the business. If the son furnishes only labor and the father provides labor, capital, and management, the son's share of the earnings will be much less than the father's. This arrangement develops in the son an appreciation of what goes into the development of a successful farm business. 2/

Major Plans Must be Jointly Developed.—The general plan of operation is agreed upon by father and son at the beginning of the year and any major decision is usually discussed between them. Care must be taken that the father does not over-rule the son's judgment in every decision of significance. If this were true, the son would soon realize that he was only a nominal supervisor and that his decisions had no weight.

Such a plan may be applied to any farm enterprise, to any number of enterprises or to the entire farm business. 4/

Frequent adjustments. If a father-son farm business agreement is to stay fair continuously to both parties, it will be necessary to review frequently the values given to each other's labor and other contributions. It is especially important that the value placed on the labor and judgment of a loyal and industrious son be increased as often as his development seems to warrant. These re-evaluations can well be made every two or three years. In this process the value assigned to the son's labor and managerial ability may normally be expected in time to equal, or even to exceed, that of his father. This recognition of a son's increasing ability requires wisdom and openmindedness on the part of the father; but only by such recognition will the two parties to the agreement enjoy the satisfactions that can be derived from it.

Good management. To succeed, the farm business must make money. The key to making money is good management, and good management includes the adoption of a cropping system that will provide a maximum of high-profit crops; the use of practices that will maintain soil productivity, bring high crop yields, and give good returns for feed fed; the keeping of suitable kinds and amounts of livestock; and the efficient use of labor, machinery, and improvements.

Guaranteed income for son. If the son contributes only his labor to the farm business, he should be guaranteed a monthly wage that will cover his personal expenses. When settlement is made at the end of the year, any payments made to him during the year will of course be deducted from his share of the net farm earnings.

If the son has accumulated considerable capital and owns an interest in the business, a guaranteed wage may not be necessary.

Well-kept farm records. Division of expenses and income under a father-son agreement should be based on well-kept farm records, which include inventories, cash receipts, and cash expenses.

A complete settlement may be made at the end of each year; but it is often more convenient merely to divide the net cash income and not consider changes in inventories until the agreement has run for several years (*Plans 2 and 3*). Under the latter arrangement, however, it may be more difficult to arrive at a settlement, especially if between settlement dates the number of livestock produced or their value has been markedly increased or decreased. But this difficulty can be partially avoided by using similar values at the beginning and at the end of the settlement period for the same grades of breeding animals.

Satisfactory living arrangements. If the son is married, it is best to provide separate living quarters for him and his family. Sometimes this can be done by dividing a large house into two apartments; sometimes a nearby house can be rented; sometimes a new home can be built either for the father or for the son.

Written agreement. Business arrangements of the size and importance of father-son agreements should be in writing. A written agreement will help to prevent misunderstandings; besides it provides evidence to support income-tax returns. 2/

1/Univ. of Ill. Bull. 502
2/Univ. of Ill. Cir. 587
3/Univ. of Minn. Bull. 389
4/Univ. of Mo. Cir. 272

FATHER-SON FARM BUSINESS AGREEMENT

OTHER CONSIDERATIONS

Time of starting. The most suitable time of year for starting a partnership is about January 1, when most farm-accounts records are begun. The record can then be used not only as a basis for dividing the farm returns between father and son at the end of the year, but also as a basis for income-tax reports and for studying the farm business.

Inventory. To determine net farm earnings when settlement is made or the agreement ends, beginning and ending inventories are necessary. In taking inventory, the father and son should agree on conservative values for home-raised horses and mules, and for home-produced breeding stock such as cows, heifers, bulls, ewes, etc.; and they should also agree to maintain such values from year to year regardless of market fluctuations. Inventory changes in home-produced breeding and work stock will then rest mainly on numbers rather than on fluctuating prices. Such an arrangement is especially important when prices are either high or low at the time the agreement is first entered into or at the time it is brought to a close. If the usefulness of breeding animals has been impaired by sickness, unsoundness, or old age, their values can be adjusted when an inventory is taken.

Purchased livestock may be inventoried on the basis of prices paid. Hogs, feeding cattle, and discarded breeding stock are valued at market prices less the expense of their sale. Buildings, land improvements, and machinery are valued at cost less depreciation, as they are for income-tax purposes.

TYPES OF AGREEMENT

Three types of father-son agreements are offered on page 433.3 They are suitable for farms that are owned or rented or part owned and part rented; and they of course can be used also by a mother and son, a father and son-in-law, an established farmer and an unrelated young man, or a father and two or more sons or daughters.

The best kind of agreement will depend on such conditions as the amount of capital invested in the business, amount of capital accumulated by the son, number of sons and daughters in the family, extent of the farm indebtedness, and the temperaments of the two parties.

To make the agreements offered here flexible enough to fit conditions on almost any Illinois farm, optional clauses and blanks for the insertion of special clauses have been provided. It should thus be easy to alter the clauses to fit the circumstances.

When the owner of a farm is ready to retire from it and desires to turn over some of its management to a son, any one of the three plans presented here may be used for the business agreement. Or if the father, on retiring, is able to finance his son or if the son is able to finance himself, the son may take over the livestock, machinery, and feed and grain and operate the farm as a tenant on a crop-share, a livestock-share, or a cash lease.

PLAN 1 . . . . is designed for situations in which a large amount of farm operating capital is required, where the son has not acquired much capital, or where the father wishes to retain full possession of all personal farm property. The general principle upon which the agreement is based is that each party is to share in the net farm returns in proportion to his contribution of labor, management, and capital.

How to compute contributions. Since the division of farm returns is in proportion to the value of the capital and labor[1] contributed by each party, these items must be valued prior to making the written agreement. The value of the capital is measured by an agreed rate of interest on the amount of capital invested by each. The labor of each is valued at what it would cost to hire such labor. In occasional instances the father may have established a reputation that has considerable value in addition to the value of his labor, as happens with a breeder of purebred livestock or a producer of seed. This additional value should receive consideration.

Other items do not need to be included in calculating the division of returns between the father and the son because they are charged to the farm account.

In arriving at the proper rate of interest, the father and son should consider: (a) prevailing rates for farm real estate and for operating capital; and (b) the rate which might be expected from alternative investments. Likewise, the labor rate should be varied according to the common rate in the community and the proportion of full time that each gives to the business.

Example. A method for arriving at an understanding between father and son concerning an equitable division of net farm income[2] is shown in the following example. Such an understanding should be reached at the beginning of the year the agreement is to cover.

	Amount	Rate	Contributions for year		
			Father	Son	Total
Father's contributions					
Land and improvements	$21 000	4%	$840	....	$840
Operating capital	5 100	5%	255	....	255
Labor	12 mo.	$50	600	....	600
Son's contributions					
Labor	12 mo.	$50	....	$600	600
Total value of contributions	......	....	$1 695	$600	$2 295
Percent contributed by each party	......	....	74	26	100

The father's contributions in the form of land and improvements, operating capital, and labor have an annual value of $1,695, or 74 percent of the total contributions of both father and son. The son, on the other hand, contributes only labor valued at $600, or 26 percent of all contributions. The father should therefore receive 74 percent of the net farm income and the son 26 percent. Farm expenses are paid, of course, before the income is divided,

Wage considerations. According to the plan, the son will receive a guaranteed wage advance at intervals, probably monthly, thruout the year. In deciding on this allowance, consideration should be given to (a) expected earnings; (b) living expenses; and (c) differences in amount of farm produce used by the father and the son in their respective households.

In years of low farm income, it may be necessary to reduce the labor allowance in accordance with the reduced income, but payment should continue to be made at regular intervals.

If the son lives with his parents and gets a wage allowance greater than that ordinarily paid a single hired man, it is reasonable for him to pay for his share of the cash cost of food, fuel, laundry, and other items.

Making settlement. Settlement is made at the end of each year and not at the time of each purchase or sale. The father has the farm bank account and settles with the son. The son, however, may have his own personal bank account.

All farm income and expense items are included in the farm-account record. The father and son agree to share increases and decreases on selected items. When expenses and net decreases are subtracted from receipts and net increases on such items, the father and son at the end of the year share the increase in proportion to their contributions.

Receipts and net increases		Expenses and net decreases	
Total	$4 674	Total	$1 315
Less expenses and net decreases	1 315		

Net farm income........... $3 359 74% = $2 486, father's share
Net farm income........... $3 359 26% = $873, son's share
Less monthly labor allowance ($50)......... $600
Cash settlement to son at end of year....... $273

It makes no difference, of course, whether the father and son share expenses in proportion to their share in the business as the expenses occur, or whether all expenses are paid from a farm bank account and the net income is divided at the end of a given period.

To get a true comparison of his income from the farm with what he might receive in other employment, the son should add to his calculations a fair value for his board, room, and other perquisites received on the farm. (If the guaranteed wage is low, however, he should not be expected to pay for his board, room, etc.)

After the annual settlement is made, the father is full owner of all property on hand which he had at the beginning of the year plus the increases or decreases in the inventory. The son may invest his accumulated cash in Government bonds or other securities until he needs the money to start farming for himself.

PLAN 2 The explanation given above for Plan 1 (where to use the Plan, how to compute contributions, and wage considerations) apply to Plan 2 also. The chief difference between these two plans is that Plan 2 uses inventories in settlement only when the agreement is brought to a close.

PLAN 3 is designed for situations in which the son has acquired considerable capital and is able to carry a large part of the managerial responsibility. The general principle on which the agreement is based is that each partner is to be paid for what he contributes to the business in the way of labor, interest on capital invested, and expenses. After deducting these items from the total farm receipts, the resulting earnings are divided equally between the father and son.

In some instances, as on large farms, there may be reason to change the share going to each party. The agreement form, for the most part, is self-explanatory.

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[1] Since labor and management are closely associated, the word *labor* is used to describe either or both.

[2] *Net farm income,* as used in this circular, means cash receipts and inventory increases less cash expenses and inventory decreases for the farm business. Thus farm products used in the household, the labor of the operator and his family, and the nonfarm portion of the automobile expenses are excluded.

DOANE AGRICULTURAL DIGEST NOV., 1946

(Printed in U. S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

FATHER-SON FARM BUSINESS AGREEMENT

FATHER-SON BUSINESS AGREEMENT

Date and names of parties

This agreement is entered into the .... day of .... 19......,

between ...., the father,

and ...., the son.

Description of land

This agreement is entered into for the purpose of operating a farm business on the following described real estate: ....

....

....

....

....

situated in the County of ...., in the State of ....; and on any other land which the father may purchase or rent for farming purposes.

Length of term

The term of this agreement shall be from the .... day of ...., 19........, to the .... day of ...., 19........, and from year to year thereafter unless written notice to terminate is given by either party to the other at least .... months prior to the beginning of the succeeding farm year.

Extent of agreement

The terms of this agreement shall be binding on the heirs, executors, administrators, and assigns of both father and son in like manner as upon the original parties, except as shall be provided by mutual agreement otherwise.

No partnership created

This agreement shall not be construed as giving rise to a partnership; and neither party shall be liable for debts or obligations incurred by the other without written consent.

Plan Adopted*

This agreement is drawn under the provision of Plan_____which is shown elsewhere on this sheet. Disregard the other two plans which are not a part of this agreement.

Arbitration

The father and son agree that if a proper settlement cannot be reached between them at the close of the period of agreement, they will submit all matters of disagreement to an arbitration committee and will abide by the decision of that committee. The father and son shall each select one arbitrator; the two arbitrators so selected shall jointly select a third, and the three shall determine the bases of settlement which to them seem equitable.

Signed..., 19 ....

....
Father

....
Son

*Supplied by Editors. This page can be used as a legal agreement by executing in duplicate after filling in the necessary data. Check to see that it applies in your state. If you have no use for this sheet and the accompanying pages, we suggest you pass them on to a son or a father who may be helped by them.

A number of colleges have brought out excellent bulletins and leases to help complete Father and Son agreements such as the following:

Purdue at LaFayette has excellent agreement forms.
Minnesota -- Extension Bulletin 298.

Based on Univ. of Ill. Cir. 587

PLAN 1

Under this plan the son furnishes only his labor and his share of the management. Annual settlement is made on a cash and inventory basis.

Division of income and other business considerations

Clause A. Division of net farm income. The net farm income at the end of the contract year shall be divided on the basis of ....% to the son and ....% to the father. . . . .

Clause B. Wage guarantee. The son is guaranteed by the father a cash income of $................ per month, the income for each month being due on or before the .... day of the following month. Such compensation shall be considered advance payment against the son's share of the net farm income at the end of the year. In case the son's share of the net farm income is not equal to the total amount paid above, he shall nevertheless be entitled to retain the above amount, and shall not be required to make any refund. The amount advanced to the son shall not be considered a part of the cost of hired labor when determining farm expenses.

Clause C. Receipts and disbursements. Since the father owns all the operating capital, he shall accept all income and pay all expenses exceeding $......................... Small expense items not exceeding $......................... may be paid by the son out of a cash operating fund amounting to approximately $........................., which shall be made available to him by the father. Commitments for expenditures exceeding $.................... shall be made only upon the consent of the father.

Clause D. Sales. Sales of grain, hay, seed, livestock, or farm produce exceeding $................ in value shall be made by the father or by the son with the father's consent.

Clause E. Living arrangements. Living arrangements shall be provided for both father and son and their families as follows:

....

....

....

If either party boards the other, the party receiving board shall pay the one providing the board $................ a month for his laundry and his share of the cash cost of food and fuel.

Clause F. Additional agreements:..

....

....

PLAN 2

Plan 2 is similar to Plan 1. The son furnishes only his labor and his share of the management. Annual settlement is made on a cash income and disbursement basis, with changes in inventory considered only in the final settlement.

Section 1—Contributions

The father and son agree that the contributions to the farm business shall be as specified in *Clauses* ...., ..., of this section, and in accordance with the following further provisions: ....

....

....

....

Clause A. Labor and management. Each party shall contribute a part or all of his labor and management to the farm business unless specifically provided otherwise. These contributions shall be valued on an annual basis as follows: father $....................., son $.....................

Clause B. Property. The father shall contribute owned land, land improvements, and buildings; also all farm personal property, including livestock, machinery and equipment, feed and grain, and other operating capital, except a limited amount of property needed to meet 4-H club requirements, which may be retained by the son. These contributions shall be valued at ....% of the total capital invested, as follows

1. Normal value of owned land and fixed improvements.........$.....................
2. Inventory value of all farm personal property.................$.....................
   Total capital invested (*add 1 and 2*).........................$.....................
3. Value of year's use of capital....................................$.....................

[Multiply value of land and fixed improvements by ....%, representing current mortgage interest rate, and value of farm personal property by ....% representing current interest rate for operating capital. Add these two amounts to get value of year's use of capital.]

Section 2 — Division of income and other business considerations

The father and son agree that they will perform or carry out their respective parts in the stipulations represented in *Clauses* ...., ..., ..., ..., ..., ..., ..., of this section, and in addition thereto jointly

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FATHER-SON FARM BUSINESS AGREEMENT

agree to the following provisions: ....

....

....

....

....

....

Clause A. Division of income. The net farm income shall be divided on the basis of ....% to the son and ....% to the father. (*Based on value of contributions shown in Clauses A and B, Section 1, above.*)

Annual settlement shall be made on the basis of cash receipts and disbursements.

Gains or losses in inventory will not be considered until .... 19...... [*or*] until the end of the agreement [*strike out the foregoing words that do not apply*], when all property will be appraised jointly by both parties under the same plan as was used in establishing conservative values when this agreement was started. The difference between the total beginning value and the total ending value of all inventories—including buildings, land improvements, livestock, machinery and equipment, feed and grain, and other fixed and operating capital—shall be considered inventory gain or loss for the entire period of the agreement. In making final settlement the father will pay the son for the son's share of any inventory gain, and receive pay from the son for the son's share of any inventory loss. Otherwise the settlement at the end of the agreement will be similar to the settlement at the end of the year.

Clause B. Wage guarantee. The son is guaranteed by the father a minimum cash income of $.............. a month, the income for each month being due and payable on the .... day of the following month. Such compensation shall be considered advance payment against the son's share of the net farm income. In case the son's share of the net farm income is not equal to the amount paid above, he shall nevertheless be entitled to retain the above amount, and shall not be required to make any refund. The amount advanced to the son shall not be considered a part of the cost of hired labor when determining farm expenses.

Clause C. Disbursements to the father. Withdrawals from the farm bank account may be made by the father to pay living expenses and to meet debt obligations to the extent that surplus funds are available. Such withdrawals shall be considered advance payments against the father's share of the net farm income.

Clause D. Bank account. There shall be a farm bank account into which all cash farm receipts shall be deposited, and from which all farm expenses shall be paid by check, except small items amounting to less than $.............., which may be paid by either party and charged against the farm bank account. For such expenditures the father or son shall be reimbursed at the end of each month. Since the father owns all the operating capital, including the bank account, he shall accept all income and pay all checks. In addition to the farm bank account, each party may have his own personal bank account.

Clause E. Farm records. The son shall keep a strict record of the farm business. The records shall include at the beginning and end of each year careful inventories of land, improvements, livestock, machinery and equipment, and feed and grain; a complete record of farm purchases and sales; and production records for crops and livestock. The record is to be used by the father and son to furnish the basis for studying the farm business, for making an equitable distribution of the proceeds, and for income-tax purposes.

Clause F. Farm receipts. Farm receipts shall include all farm income from all sources, including such items as livestock, livestock products, crops, agricultural-adjustment and subsidy receipts, machinery, etc.

Clause G. Farm expenses. Farm expenses shall include livestock purchases; livestock expenses; feed purchases; crop expense; wages and cash cost of board for hired labor; taxes; cash rent; capital and maintenance expenses for buildings and land improvements and for machinery and equipment; farm share of telephone and electricity; and, all other.. farm expense items

Clause H. Inventories. All property owned by the father which is used in the operation of this farm shall be carefully inventoried pursuant to the needs expressed in *Section 1, Clause B*, and in *Section 2, Clauses A and E.*

Clause I. Living arrangements. Living arrangements shall be provided for both father and son and their families as follows: ....

....

....

....

If either party boards the other, the party receiving board shall pay the one providing the board $.......... a month for his laundry and his share of the cash cost of food and fuel.

Clause J. Management. General operating plans shall be discussed and agreed upon by the father and son. All farm purchases and sales amounting to more than $.......... shall be made only with the knowledge and consent of both parties.

PLAN 3

The son contributes half the operating capital, his own labor, and his share of the management. Annual settlement is on a cash income and disbursement basis. Change in inventory is considered only in final settlement.

Section 1 — Contributions

The father and son agree that the contributions to the farm business shall be as specified in *Clauses* ...., ..., ..., of this section, and in accordance with the following further provisions: ....

....

....

....

Clause A. Labor and management. Each party shall contribute a part or all of his labor and management to the farm business unless specifically provided otherwise (a son may be in school; father may have other business). If the contributions are not essentially the same, they may be equalized by the father paying the son, or the son paying the father, out of the undivided farm receipts, for labor and management put into the farm business in excess of that contributed by the other party. In making such settlement, labor and management (per month) shall be valued at the following rates per month for the months worked: father $........................, son $........................

Clause B. Real estate. The land, land improvements, and buildings may be either owned or rented by the father. If owned by the father, the father shall receive at the end of the year ....% interest on his investment based on a normal valuation for land, land improvements, and buildings. If the son also owns a part of the real estate, compensation will be made to the party whose contribution is the larger, as follows:

Father: acres..........; value with improvements..$..................@......%=$..............

Son : acres..........; value with improvements..$..................@......%=$..............

Difference due father, son..$..............
[*Strike out word that does not apply*]

Clause C. Farm personal property. The son shall acquire a half interest in the livestock, machinery and equipment, feed and grain, and the farm bank account (if any) at the beginning of the agreement. The total conservative value of the farm personal property at the beginning of this agreement is $.................... Of this total amount the father owns $.............. and the son owns $.................... In order to make the son's share equal to one-half of the total, the son agrees to pay or give his note to the father for $..............

Section 2 — Division of income

The father and son agree that division of income shall be as specified in this section except as follows: ....

....

....

After each party is paid for what he contributes to the farm business, the net farm income is to be divided equally between the father and the son.

Annual settlement shall be on a cash receipt and disbursement basis.

Clause A. Farm receipts. Farm receipts shall include all farm income from all sources, including such items as livestock, livestock products, crops, agricultural-adjustment and subsidy receipts, machinery, etc.

Clause B. Farm expenses. Farm expenses shall include livestock purchases; livestock expenses; feed purchases; crop expense; wages and cash cost of board for hired labor; taxes; cash rent; capital and maintenance expenses for buildings and land improvements and for machinery and equipment; farm share of telephone and electricity; and, all other.. farm expense items

Clause C. Inventories. Gains and losses in inventory shall not be considered until ...., 19......., or until the end of this agreement [*strike out the foregoing words that do not apply*], when all property will be appraised jointly by both parties under the same plan as was used in establishing conservative values when this agreement was started. The difference between the total beginning value and the total ending value of all inventories—including buildings, land improvements, livestock, feed and grain, machinery and equipment, and other fixed and operating capital—shall be considered inventory gain or loss for the entire period of the agreement. In making settlement, the farm personal property or the net proceeds from the sale of the farm personal property shall be divided equally between father and son. The father will also pay the son for the son's share of any inventory gain in buildings and land improvements, and receive pay from the son for the son's share of any inventory loss in these items. Otherwise the settlement at the end of the agreement will be similar to the settlement at the end of the year.

Section 3 — Banking arrangements

The parties to this contract agree that the banking arrangements shall be as outlined in this section except as follows: ....

....

....

....

Joint checking account. There shall be a joint farm checking account into which all cash farm receipts shall be deposited, and from which all expenses shall be paid by check, except small items amounting to less than $......................, which may be paid by either party and charged against the farm bank account. For such expenditures the father or son shall be reimbursed at the end of each month. If this plan is followed, the annual settlement will be made by balancing the withdrawals by each party for living expenses and debt payments during the year and by paying the following from the joint checking account: **(a)** ....% interest to the party with the larger investment, for his capital contribution in excess of that of the other party; and **(b)** by paying the party contributing the most labor and management for the excess above that contributed by the other party. Checks shall be signed by the father, son, both parties [*cross out the words that do not apply*].

Section 4 — Other farm business consideration

In addition to the foregoing articles of agreement, the father and son agree that they will perform and carry out the stipulations represented in *Clauses* ...., ..., ..., of this section; and in addition thereto they jointly agree to the following provisions: ....

....

....

....

Clause A. Farm records. The son shall keep a strict record of the farm business. The record shall include, at the beginning and end of each year, careful inventories of land, land improvements, and buildings, livestock, machinery and equipment, and feed and grain; a complete record of farm purchases and sales; and production records for crops and livestock. The record is to be used by the father and son to furnish the basis for studying the farm business, for making an equitable distribution of the proceeds, and for income-tax purposes.

Clause B. Living arrangements. Living arrangements shall be provided for both father and son and their families as follows: ....

....

....

....

If either party boards the other, the party receiving board shall pay the one providing the board $.......... a month for his laundry and his share of the cash cost of food and fuel.

Clause C. Management. General operating plans shall be discussed and agreed upon by father and son. All farm purchases and sales amounting to more than $.............. shall be made only with the knowledge and consent of both parties.

Based on Univ. of Ill. Cir. 587

HOW TO TEST YOUR FARM LEASE

TENANT – LANDOWNER CONTRIBUTIONS – Different Forms of Leases

[3] Usual items of farm investment and expense of operation	Value	Rate of Interest	Cash Lease Annually — Contributions by		Cash Share Lease Annually — Contributions by		Livestock Share Lease Annually — Contributions by		Manager Tenant Lease Annually — Contributions From		
			Tenant	Land-owner	Tenant	Land owner	Tenant	Land-owner	Farm account	Tenant	Land-owner
Investment Expense											
1. Land				all		all		all			all
2. Buildings				all		all		all			all
3. Work horses			all		all		all				all
4. Other livestock			all		all		part	part			all
5. Machinery and tools			all		all		all				all
6. Feed			all		all		part	part			all
7. Cash to operate farm			all		all		part	part			all
Total interest charges											
Other Expenses											
8. Hired labor			all		all		all			all or part	all or part
9. Cash cost of board			all		all		all		all		
10. Operator's labor			all		all		all			all	
11. Unpaid family labor			all		all		all			all	
12. Feed for work horses			all		all		variable	variable	all		
13. Depreciation for work horses			all		all		all		all		
14. Machinery repairs			all		all		all		all		
15. Machinery depreciation			all		all		all		all		
16. Building repairs				all		all		all	all		
17. Building depreciation				all		all		all	all		
18. Skilled labor (not furnished by tenant)				all		all		all			all
19. Fence repairs				all		all		all	all		
[illegible] Fence depreciation				all		all		all	all		
21. Machine work hired			all		all		part	part	all		
22. Livestock expense			all		all		part	part	all		
23. Seeds			part	part	part	part	part	part	all		
24. Twine			all		all		part	part	all		
25. Fertilizer (purchased)				all *		all *		all*	all		
[illegible] Tractor fuel			all		all		part	part	all		
27. Insurance buildings				all		all		all			all
28. Insurance livestock			all		all		part	part	all		
29. Taxes real estate				all		all		all			all
30. Personal Property			all		all		part	part	all		
31. Cash rent			all		all						

* In many communities it is more common to divide the cost of commercial fertilizer in the same proportion that crops or income are divided. Editor

Lease forms are available that are well adapted to many varying situations. They can be secured through County Agents, the College Experiment Stations, and the U.S. Department of Agriculture, at little or no cost.

A tenant and landlord who have found a form that fits their situation, need only to fill in the blanks and sign the agreement. In case such forms are not acceptable, it may be best for the contracting parties to work out one of their own.

Digest page 434.3 suggests an outline of the procedure to follow in writing your own lease form.

A tenant ought to consider both the landlord and the farm. The personal qualities of the landlord may have just as much influence as those of the tenant. Friction is unlikely if the landlord is completely honest, straightforward, good-natured, and agreeable. In a cash lease, the relationship between landlord and tenant may, by the preference of both parties, be quite impersonal, whereas in a stock-share lease the relationship is often so close that tolerance, good feeling, and the spirit of mutual cooperation are essential for success.

A landlord should select a tenant with special regard to his personal qualities. Of these, capability as a farmer is basic, while honesty and a cooperative disposition are also highly important. Experience as a manager and efficiency as a producer are necessary characteristics of a good tenant, even though the landlord can devote considerable time to supervising the farming. The tenant should have, or be able to obtain, the necessary equipment and the capital to farm efficiently [1]

When the general allocation of expenses has been tentatively agreed upon and the amounts of the various items set down, the total amount shown as the contribution of one party or the other may prove to be higher or lower than the *proportion* agreed upon, and some adjustment of items will be needed.

The only requirements of a legal farm lease are (1) accurate description of the property leased; (2) a definite and agreed term over which the lease extends; (3) a definite and agreed price of rental, together with designation of the time and place at which payment is to be made; and (4) the signatures of the contracting parties. [2]

TESTING THE LEASE

CONTRIBUTIONS OF TENANT AND LANDLORD FOR ONE YEAR UNDER A LIVESTOCK SHARE LEASE FOR 160 ACRES OF LAND

[2]	Value	Percent interest	Expense		
			Total	Tenant	Landlord
Investment items					
1. Land	$31 000	4 5	$1 395		$1 395
2. Buildings	3 690	6	222		222
3. Work animals	300	6	18	18	
4. Other livestock	1 890	6	113	57	56
5. Machinery and equipment	1 734	6	104	104	
6. Feed for work animals	130	6	8	4	4
7. Feed for productive livestock	800	6	48	24	24
8. Cash to operate farm					
Total interest charges			$1 908	$207	$1 701
Other expenses					
8. Ordinary hired labor			$ 300	$ 300	$
9. Cash cost of board			100	100	
10. Operator's labor			480	480	
11. Unpaid family labor			200	200	
12. Feed for work animals			130	130	
13. Purchased feed for productive livestock			152	76	76
14. Depreciation on work animals			20	20	
15. Machinery depreciation and repairs			610	610	
16. Building repairs			40		40
17. Building depreciation			60		60
18. Skilled labor (not furnished by tenant)					
19. Fence repairs			10		10
20. Fence depreciation			10		10
21. Machine work hired			100	50	50
22. Livestock expense			152	90	62
23. Seeds			28	14	14
24. Twine			30	15	15
25. Fertilizer (purchased)					
26. Tractor fuel			200	200	
27. Insurance on buildings			30		30
28. Insurance on livestock			50	30	20
29. Taxes on real estate			165		165
30. Taxes on personal property			50	40	10
31. Cash rent					
Total expenses			$4 825	$2 562	$2 263

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[1] Farmers' Bulletin 1969 [2] Univ. of Ill. Cir. 503
[3] American Life Conventions Farm Lease Committee - An Analysis of the Corn Belt and Wheat Belt States.

FARM LEASE — CHECK LIST

Below is a check list of items that landlords and tenants may need to consider when drawing up a farm lease. Of course, no single lease would contain all of these things. But the list might be used advantageously by the landlord and tenant: Together, they might review and discuss the various points, discarding the unnecessary ones and checking those considered suitable for the particular contract. Then, as the lease is put in writing, the list could serve as a guide in assuring both parties that pertinent and important items are not being overlooked or omitted.

I. MINIMUM ESSENTIALS

1. Time specifications and designation of parties:
   - ☐ *a.* Date of making lease.
   - ☐ *b.* Date lease becomes effective.
   - ☐ *c.* Date tenant's occupancy ends.
   - ☐ *d.* Name and address of landlord.
   - ☐ *e.* Name and address of tenant.
2. Description of property leased:
   - ☐ *a.* Name of farm.
   - ☐ *b.* Farm boundaries or legal description.
   - ☐ *c.* State, county, community.
   - ☐ *d.* Number of acres in farm.
   - ☐ *e.* Reservations of any part for landlord
3. Signatures and acknowledgment:
   - ☐ *a.* Signature of landlord.
   - ☐ *b.* Signature of tenant.
   - ☐ *c.* Signature of wife, if required.
   - ☐ *d.* Signatures of witnesses, if required.
   - ☐ *e.* Acknowledgment or recording, if required.

II. STABLE AND SECURE TENURE

1. Lease period:
   - ☐ *a.* One year.
   - ☐ *b.* Term of years.
   - ☐ *c.* Year to year.
2. Provisions for cancellations:
   - ☐ *a.* When operative.
   - ☐ *b.* Conditions under which operative.
   - ☐ *c.* Length of notice required.
3. Provisions for termination:
   - ☐ *a.* Compensation for disturbance.
   - ☐ *b.* Terminates at end of period without notice.
   - ☐ *c.* Date notice of termination is due.
4. Provisions for renewal:
   - ☐ *a.* Continues automatically from year to year.
   - ☐ *b.* Other type of renewal mutually agreeable.
5. Procedure in case:
   - ☐ *a.* Of death of either party.
   - ☐ *b.* Either party becomes bankrupt.
   - ☐ *c.* Tenant becomes incapacitated.
   - ☐ *d.* Mortgagee takes possession.

III. EQUITABLE RENTAL RATES

1. Basis for rental rates:
   - ☐ *a.* Farm productivity.
   - ☐ *b.* Relative contribution of the two parties.
   - ☐ *c.* Participation in agricultural programs.
2. Kind and amount of rent to be paid:
   - ☐ *a.* Cash.
   - ☐ *b.* Standing.
   - ☐ *c.* Share.
   - ☐ *d.* Expenses to be deducted before division of produce.
   - ☐ *e.* Products for family use.
   - ☐ *f.* Feeding work stock from undivided grain and hay.
   - ☐ *g.* Privilege of buying at farm prices the landlord's share of feed crops for on-farm use.
3. Specifications on payment of rent:
   - ☐ *a.* Time when payment is due.
   - ☐ *b.* Place where payment is due.
   - ☐ *c.* Method of dividing share rent.
   - ☐ *d.* Work to be performed instead of payment of rent.
4. Schedule for sliding-scale rentals based on:
   - ☐ *a.* Fluctuations in prices of one product.
   - ☐ *b.* Fluctuations in prices of several products.
   - ☐ *c.* Variations in production conditions.
5. Rent rebates for production losses beyond tenant's control:
   - ☐ *a.* Hail.
   - ☐ *b.* Freezes.
   - ☐ *c.* Flood.
   - ☐ *d.* Drought.
   - ☐ *e.* Fire.
   - ☐ *f.* Disease damage.
   - ☐ *g.* Insect damage.

IV. CONSERVATION AND IMPROVEMENT OF THE FARM

1. Development and maintenance of improvements:
   - ☐ *a.* Supplying materials.
   - ☐ *b.* Supplying fruit trees and shrubs.
   - ☐ *c.* Furnishing skilled labor.
   - ☐ *d.* Furnishing unskilled labor.
   - ☐ *e.* Insurance on buildings.
2. Compensation for improvements:
   - ☐ *a.* Major improvements.
   - ☐ *b.* Minor improvements.
   - ☐ *c.* Soil and land improvement.
   - ☐ *d.* For superior farming.
3. Authorization to remove improvements made by tenant:
   - ☐ *a.* Buildings.
   - ☐ *b.* Fences.
   - ☐ *c.* Fixtures.
4. Items requiring special treatment:
   - *a.* Provisions regarding use and sale of:
     - ☐ (1) Timber.
     - ☐ (2) Sand.
     - ☐ (3) Gravel.
     - ☐ (4) Fish.
     - ☐ (5) Game.
     - ☐ (6) Minerals.
   - *b.* Specifications on care and maintenance of:
     - ☐ (1) Drains and ditches.
     - ☐ (2) Reservoirs and ponds.
     - ☐ (3) Terraces and check dams.
     - ☐ (4) Bridges.
     - ☐ (5) Roads.
     - ☐ (6) Buildings.
     - ☐ (7) Fences.
     - ☐ (8) Gates.
     - ☐ (9) Windmills.
     - ☐ (10) Motors.
     - ☐ (11) Pumps.
     - ☐ (12) Orchards and vineyards.
     - ☐ (13) Farm wood lot.
   - *c.* Time and frequency of mowing or grubbing:
     - ☐ (1) Fields.
     - ☐ (2) Pastures.
     - ☐ (3) Roads.
     - ☐ (4) Fence rows.
     - ☐ (5) Around buildings.
   - *d.* Waste:
     - ☐ (1) Compensation for dilapidations.

V. EFFICIENT PRODUCTION

1. Rules of good husbandry regarding:
   - ☐ *a.* General farming operations.
   - ☐ *b.* Supervision by the landlord.
   - ☐ *c.* Time of pasturing livestock.
   - ☐ *d.* Control of disease among livestock.
   - ☐ *e.* Ringing of hogs.
   - ☐ *f.* Spraying crops.
2. Specifications regarding crops and livestock:
   - ☐ *a.* Map of farm.
   - ☐ *b.* Acreage of crops to be grown.
   - ☐ *c.* Location of these crops on the farm.
   - ☐ *d.* Rotation to be followed.
   - ☐ *e.* Winter cover crops.
   - ☐ *f.* Kind and quantity of seed.
   - ☐ *g.* Number of each class of livestock.
   - ☐ *h.* Breed of livestock.
   - ☐ *i.* Insurance on crops and livestock.
3. Participation in Government programs:
   - ☐ *a.* Crop adjustment.
   - ☐ *b.* Soil conservation.
   - ☐ *c.* Modification in farming system.
   - ☐ *d.* Home wood lot.
   - ☐ *e.* Wildlife preservation.
4. Specifications regarding use of crops:
   - ☐ *a.* Sale.
   - ☐ *b.* Feed on farm.
   - ☐ *c.* Handling of straw, fodder, manure.
   - ☐ *d.* Pasturing small grain.
5. Actions agreed upon in case of neglect:
   - ☐ *a.* Hiring persons.
   - ☐ *b.* Hiring machines or custom work.
   - ☐ *c.* Buying materials.

VI. RESPONSIBILITIES OF THE CONTRACTING PARTIES

1. Relating to performance:
   - ☐ *a.* Warranty that landlord has right to lease farm.
   - ☐ *b.* Procedure in event farm is sold.
   - ☐ *c.* Right of landlord to inspect, improve, and repair.
   - ☐ *d.* Agreement regarding subletting of farm.
   - ☐ *e.* Continuous occupancy throughout the lease period.
   - ☐ *f.* Agreement regarding off-farm work.
   - ☐ *g.* Yielding possession at end of lease period.
   - ☐ *h.* Working for landlord.
   - ☐ *i.* Assignment of rights covered in lease.
2. Relating to joint property:
   - ☐ *a.* Appraisals at beginning of lease.
   - ☐ *b.* Purchases and sales with and without consultation.
   - ☐ *c.* Keeping farm records.
   - ☐ *d.* Furnishing vouchers and receipts.
   - ☐ *e.* Handling joint or undivided funds.

3. Relating to settlement at termination of lease:
   - ☐ *a.* Appraisal of joint property.
   - ☐ *b.* Method of dividing joint property.
   - ☐ *c.* Acreages plowed, seeded, or planted to crops:
     - ☐ (1) At beginning of lease.
     - ☐ (2) Compensation for excess at end of lease.
     - ☐ (3) Payment for deficiency at end of lease.
   - ☐ *d.* Payment of outstanding debts of joint responsibility.

VII. OPERATING CAPITAL AND EXPENSES

1. Respective contributions to operating capital:
   - ☐ *a.* Machinery and equipment.
   - ☐ *b.* Special tools and machines.
   - ☐ *c.* Work stock and power.
   - ☐ *d.* Productive livestock.
2. Respective contributions to labor and operating expenses:
   - ☐ *a.* Regular labor.
   - ☐ *b.* Special labor.
   - ☐ *c.* Machine hire or custom work.
   - ☐ *d.* Packing and processing charges.
   - ☐ *e.* Feed costs, veterinary charges, breeding fees, and other livestock expenses.
   - ☐ *f.* Seeds.
   - ☐ *g.* Fertilizer and lime.
   - ☐ *h.* Spray and dusting materials.
   - ☐ *i.* Fuel and oil for tractors, trucks, and power equipment.
   - ☐ *j.* Electricity for farm use.
3. Credit for operating expenses:
   - ☐ *a.* Furnished by landlord.
   - ☐ *b.* Furnished by tenant.
   - ☐ *c.* Furnished by bank, PCA, FSA, or others.
4. Special facilities to increase production:
   - ☐ *a.* Additional and temporary fencing.
   - ☐ *b.* Additional and temporary buildings.
   - ☐ *c.* Special types of seed.
   - ☐ *d.* Development of new pastures.
   - ☐ *e.* Development of water supply.

VIII. GENERAL PROVISIONS

1. Settling differences:
   - ☐ *a.* Arbitration.
   - ☐ *b.* Court action.
2. Declarations pertaining to partnership status:
   - ☐ *a.* Disavowals.
   - ☐ *b.* Admissions.
   - ☐ *c.* Qualifications.

HOW TO PREPARE A GOOD FARM LEASE

Both landlords and tenants need complete, written leases for protection and sound business relationships. Too many have only oral agreements or sketchy contracts. Death of either party and many other unexpected changes can cause serious problems where there is not an adequate, written contract.

The need is great. Almost 3,000,000 farmers in the United States are renters. Four-fifths of these rent all the land they operate.

The following covers essentials for a binding contract. It can be expanded to cover each particular situation. Fancy forms and legal phraseology are unnecessary. Plain paper and plain language are all that are needed.

This agreement is made this____day of____19__, by and between ______of______, ______, landowner, and____of____, tenant.

The Landlord, in consideration of the agreements set forth in this lease to be kept and performed by the Tenant, rents and leases to the Tenant, to occupy and to use for agricultural purposes, the following real estate located in the County of______, and State of ______, commonly known as the___farm and consisting of approximately___acres, together with all buildings and improvements (belonging to the Landlord) on the property.

(Insert Legal Description Here)

The term of this lease shall be from the___day of____19__, to the__day of____19__, and from year to year thereafter unless written notice to terminate is given by either party to the other, at least__months prior to beginning of succeeding year.

The terms of this lease shall be binding on the heirs, executors, administrators, and assigns of both Landlord and Tenant in like manner as upon the original parties, except by mutual agreement otherwise.

Section 1. The Landowner Agrees:

1. To furnish the above described land and farm buildings; to have the same in a satisfactory state of repair at the beginning of the lease and to maintain it so during the term of the lease.
2. To furnish materials required for building and fence repairs or replacements, and to supply the labor...agreed to by owner.
3. To replace as soon as possible any buildings destroyed by fire or accident, or to make suitable adjustments in rent, in lieu thereof.
4. To furnish__of the seed for seeding of biennial or perennial grass and legume crops.
5. To pay - % of (combining, shelling, fertilizer, lime.)

Section 2. The Tenant Agrees:

1. To operate the farm in the best possible manner; to spread all manure produced on the fields as designated by the landowner; to cut all noxious weeds before seeding; to keep the farmstead neat, orderly, and clean; to work the land in such a fashion as to prevent damaging erosion; to furnish all ordinary repair due to normal wear and tear.
2. To sow grasses and legumes as directed by the owner...
3. To plant as nearly as practicable the following acreages of crops. Any substantial variation from this to be done only with the knowledge and consent of the landowner.

Crops	Acres	Variety	Comments

4. To occupy the buildings and live on said farm.
5. To sublease no part of the farm without the consent of the owner.
6. To plow no pasture or hay land without the consent of the owner.
7. To use on the farm all straw and roughage produced, and to sell none without the landowner's permission.
8. To burn no straw or other roughage...consent...landowner.
9. To cut no live timber without the consent of the owner.
10. To pay all costs connected with the production, harvesting.. ....except........which amounts will be paid by landowner.

SUGGESTIONS

1. Date lease is made.
2. Name and address of the landowner -- and tenant.
3. A "consideration" must be shown to be legal.
4. Show length of time lease is to run and include provision for continuance. A short beginning term of 1 to 3 years gives both parties a chance to see if they can work together effectively. Some states provide that excessively long agricultural leases, say 10 years, are not valid. Provide for at least 6 months notice of termination. This will make future planning easier and add to security of occupancy.
5. (See Section 1) Include all items that the landowner agrees to furnish, provide or replace. Make certain that all possible sources of disagreement are taken care of. The items will differ slightly depending on whether it is cash or crop share lease. All arrangements as to the landowner's share of costs of such items as hay chopping, shelling, etc., should be shown.
6. (See Section 2) Include such items as pasture practices; care of new meadows; government program participation; agreements concerning inoculation of legume seed by tenant; housing of cars and trucks in barns; cleaning and repairing of tile drains and tile outlets and all other practices applicable to the local area, the farm, the crops, and the livestock. Each party must faithfully perform the respective duties which are his contribution toward operation of the farm. A well balanced farm program worked out in advance by landowner and tenant will prevent the occurence of many problems in operating the farm. (cont.)

DOANE AGRICULTURAL DIGEST 1947

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

HOW TO PREPARE A GOOD FARM LEASE

(continued)

Section 3. Reservations and Privileges

1. The landowner reserves the right of entry in person or by agent, for the purpose of inspection and/or maintaining...(specify)
2. The landowner reserves......(space for crop storage).
3. The tenant is entitled to such fuel as may be produced in cobs and down or dead timber.
4. The tenant is permitted to make permanent improvements to the value of $____with the written consent of the landowner.

Section 4. Payment of Rent:

1. The tenant agrees to pay the landowner as rental for the above described farm:
    a. The following share of all crops grown, delivered.....
    (List crops; show landowner's share, time and place of delivery)
    b. $____per acre per year for____acres of land in (lots, pasture, hay.) Payment shall be made on or before......(show dates)
2. Unless otherwise consented to by the landowner in writing, the tenant agrees not to sell, remove, or permit to be sold or removed, any of the crops produced on said farm until the division thereof and settlement has been made for cash rent and any other indebtedness of the tenant to the landowner, and until final settlement hereunder; **and until such division of crops and settlements have been completed, the title and possession of all crops produced on said farm during the current crop year shall remain in the landowner.**

Section 5. Items Not Specified:

1. In the event that the landowner and tenant cannot reach an agreement on any matter connected with the lease or its application, the matter shall be referred to a committee of three arbitrators, one chosen by the landowner, one by the tenant, and the third by the two thus chosen. The decision of this committee shall be accepted as final.
2. ________________(other items)

Section 6. Termination of Agreement:

1. Failure on the part of either party to perform any of the terms, covenants, or conditions covered by this agreement, shall constitute ground for termination hereof, at the option of the other party.
2. The tenant shall have claim to and be reimbursed for unexhausted improvements, undertaken with the consent of the landowner, and which cannot be removed from the farm.
    a. Plowing done in excess of, etc.______$ per acre.
    b. Unharvested crops in the ground or field.....(list)
    c. Repairs and improvements made at tenant's expense with prior consent of the landowner.
3. The tenant agrees to give peaceable possession of the farm at the termination of the lease.
4. The tenant shall leave the place in as good condition as when he took it over, except for ordinary wear and tear, and shall be responsible for willful destruction.....(be specific when possible)

Section 7. Other Provisions

1. ________________(any items not already covered).

Witness our hands and seals the date above first written. Duplicate copies signed.

Witnesses:________________________
____

Landowner________________
Tenant___________________
Tenant's wife______________

7. (See Section 3) The right of entry clause is very important. Do not omit. All special reservations or rights of landowner or tenants not covered in the lease should be included here. Give thought to this section. If the landowner is desirous of retaining the use of storage facilities on the farm the specific building should be included in a clause in this section.

8. (See Section 4) Make certain that the delivery point of landowner's share of crops is specified. There will be wide variation in the contents of this section, depending on the type of lease. A cash rent lease would substitute a schedule of payments and would itemize the rent to be paid per acre on cropland, pastureland, etc.

9. (See Section 5) In some states an agreement to arbitrate, if entered into before controversy arose, cannot be enforced. Check your own state law to see if this clause is legal. Make provision for cost of arbitration.

10. (See Section 6) A clause should be included giving either party right to terminate if the other party fails to perform any of the terms, conditions, etc. A full and definite coverage of the method of settlement for unexhausted improvements and the right to remove any fences or buildings by the tenant, should also be included.

11. (See Section 7) The lease should be signed by landowner and tenant and frequently by wives of both. The signatures of witnesses are required in some cases. Record the lease particularly in those states where required. Acknowledgement before a Notary Public may be necessary, particularly if the lease is to be filed or recorded.

IMPORTANT: This skeleton lease is to be used as a guide only, and is not intended for actual use. Lease forms are available through your Agricultural College and County Agent. They should contain special clauses applicable to your state and show any legal requirements to meet your state laws.

Livestock, 50-50 leases, and other special leases require special care in completing. Ask your College for the type of lease you need.

A written lease is a necessary protection. A complete contract is a valuable farm management guide.

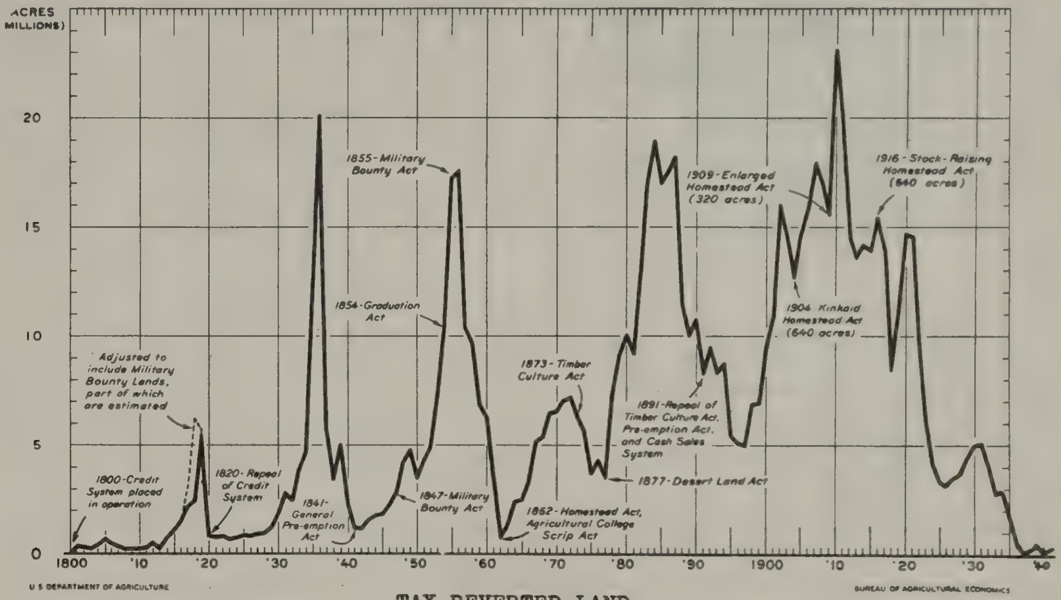
LAND SETTLEMENT AND REVERSION

As shown by the following graph, public land entries and settlements have been repeatedly stimulated by various national homestead laws. In addition, states have used a variety of methods of inducing private ownership and use of unappropriated lands. In retrospect, it is easy to see the great damage caused by such a variety of laws which had little or no relationship to practical economic use of the land.

At this late date the National Government and many states have largely reversed their attitude on land settlement.

Public land has now been withdrawn from entry by three executive orders, one in November 1934, one in February 1935, and another in May 1935, which has retarded entries considerably. Land is entered now only after classification and an effort is being made to re-acquire land that should be continued under government control.

ORIGINAL LAND ENTRIES, 1800-1934



TAX-REVERTED LAND

In recent years particularly, there has been an increasing amount of land reverting to public ownership by abandonment because of taxes. In some states this acreage is very large and, as could be expected, the former owners have robbed such land of its possibility of immediate economic return either by depleting the soil fertility and/or by removing all timber and other readily available natural resources.

Very little has been done by the governmental units to which such lands revert, to set up an adequate program for public use and control.

DISPOSITION OF TAX-REVERTED LAND AMONG UNITS OF GOVERNMENT

Land Reverts to State
- Alabama
- Arizona
- Arkansas
- California
- Florida
- Illinois
- Indiana
- Kentucky
- Louisiana
- Michigan
- Minnesota
- Mississippi
- New Mexico
- Ohio
- South Carolina
- Tennessee
- Texas
- Virginia
- West Virginia

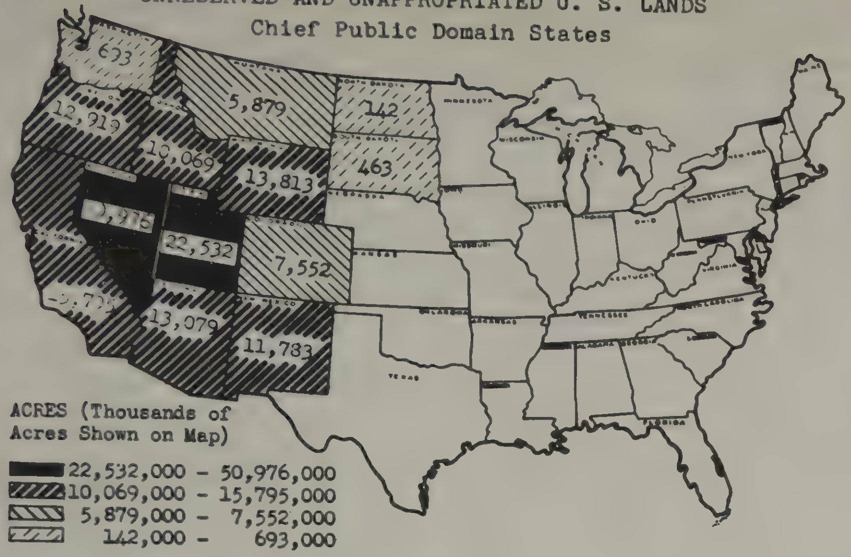
Land Reverts to County
- Colorado
- Delaware
- Georgia
- Idaho
- Iowa
- Kansas
- Maryland
- Missouri
- Montana
- Nebraska
- Nevada
- New Jersey
- New York
- North Carolina
- North Dakota
- Oklahoma
- Oregon
- Pennsylvania
- South Dakota
- Utah
- Washington
- Wisconsin
- Wyoming

Land Reverts to Town
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont

National Resources Board and U.S.D.A.

PUBLIC LANDS

UNRESERVED AND UNAPPROPRIATED U. S. LANDS
Chief Public Domain States

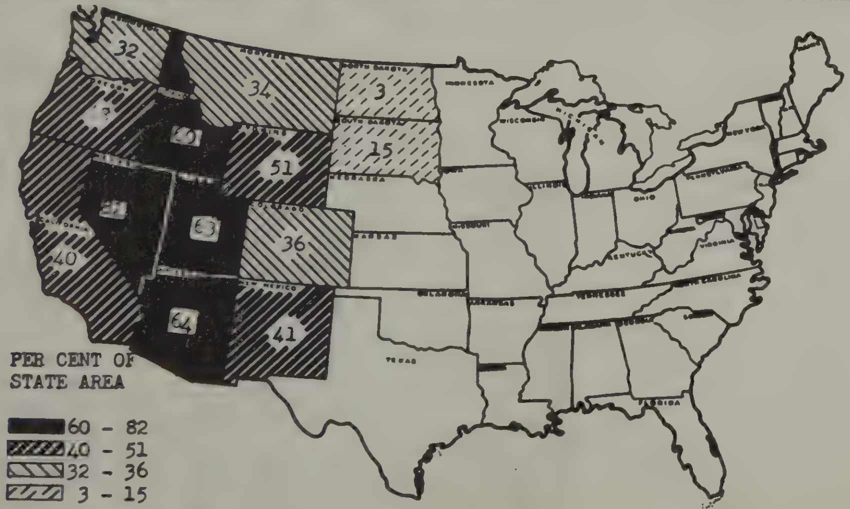


STATUS OF PUBLIC DOMAIN LANDS, JUNE 30, 1934

	Acres
1. Unreserved and Unappropriated Lands. (Estimated to be of no use at present - 32,750,000 acres)	165,695,479
2. Withdrawals, part of which may again be subject to entry	30,442,832
3. Unperfected entries, part of which will revert to public domain and become subject to entry	24,080,779
Maximum amount which may be withdrawn under Taylor Act	80,000,000
Total original land entries, 1935 to 1942 inclusive	3,002,076

PER CENT OF STATE AREA IN PUBLIC DOMAIN AND LAND APPROPRIATED FOR PUBLIC PURPOSES

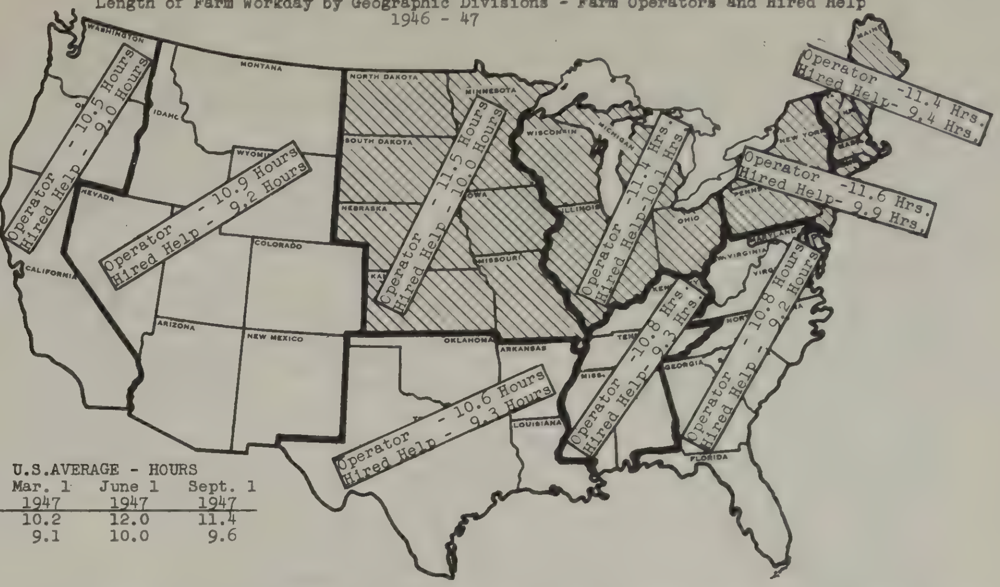
Includes Unreserved and Unappropriated Land, Unperfected Entries, National Forests, National Parks and Monuments, and Indian Lands for Chief Public Domain States



Data from National Resources Board and U.S.D.A.

FARM WORKDAY

Length of Farm Workday by Geographic Divisions - Farm Operators and Hired Help
1946 - 47



U.S. AVERAGE - HOURS

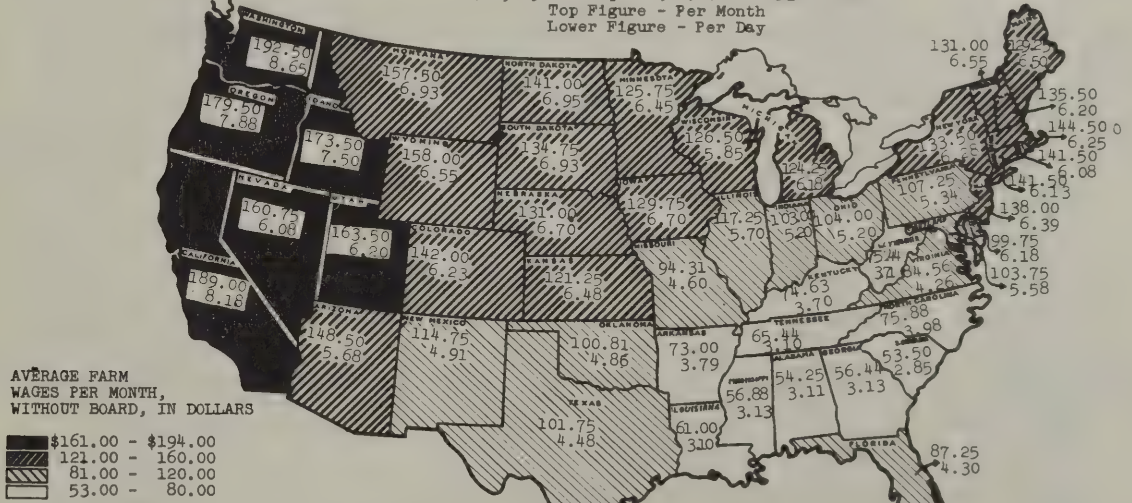
	Dec. 1 1946	Mar. 1 1947	June 1 1947	Sept. 1 1947
Operator	10.5	10.2	12.0	11.4
Hired Help	9.1	9.1	10.0	9.6

The length of the farm workday, as shown on the map above, was calculated by averaging the reported number of hours worked on December 1, 1946, and March 1, June 1 and September 1, 1947. The results are shown on the map by geographic divisions.

Although the length of the farm workday has shown little change during the past decade, wage rates have increased tremendously, according to the Bureau of Agricultural Economics. Farm wages rates on July 1, 1947 were 3½ times as high as the 1935-39 average.

FARM WAGES

Oct. 1, 1946 - Sept. 1, 1947 - Without Board
Top Figure - Per Month
Lower Figure - Per Day



AVERAGE WAGE RATES PAID TO HIRED FARM LABOR
By Geographic Divisions, Oct. 1, 1946 - Sept. 1, 1947

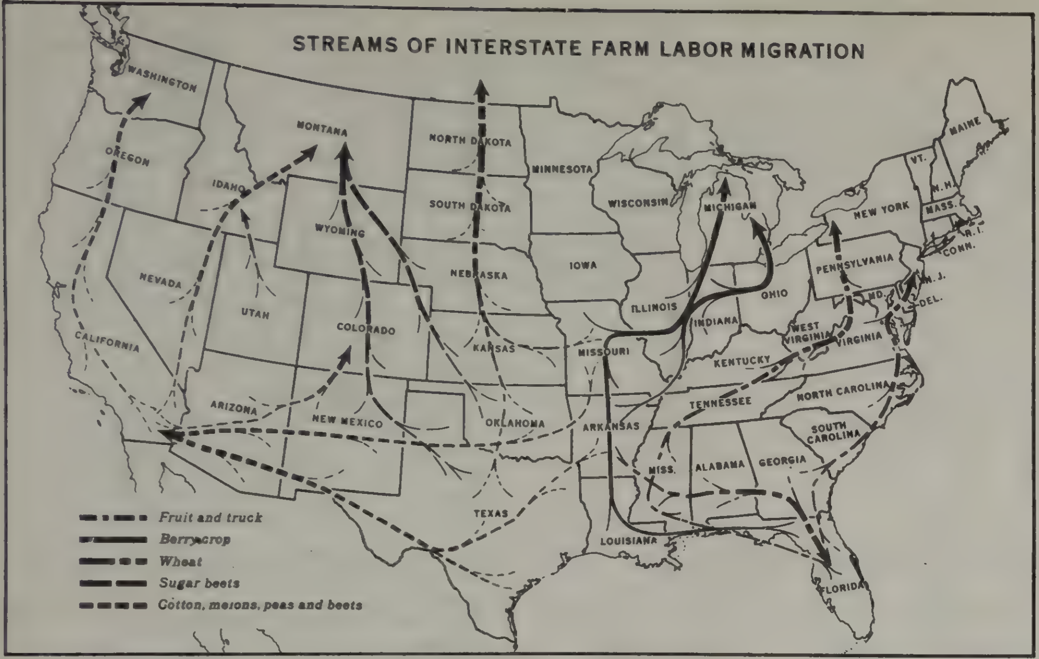
	PER MONTH		PER DAY	
	With Board	Without Board	With Board	Without Board
New England	$95.40	$139.00	$4.96	$6.25
Middle Atlantic	91.30	126.00	4.76	5.84
East North Central	89.00	118.00	4.61	5.62
West North Central	95.90	123.00	4.82	6.15
South Atlantic	51.80	73.00	3.11	3.80
East South Central	44.00	60.90	2.50	3.15
West South Central	65.80	91.00	3.38	4.06
Mountain	114.00	152.00	5.09	6.10
Pacific	149.00	190.00	6.56	7.93
U. S. Average	91.50	107.00	4.17	4.77

The sharp rise in farm wage rates from the 1935-39 period to 1946 is shown by the following figures:

		1935-39 Avg.	1946	Increase
PER MONTH,	With Board -	$26.01	$88.90	$62.89
	Without Board -	34.17	103.00	68.83
PER DAY,	With Board -	$1.23	$4.15	$2.92
	Without Board -	1.50	4.74	3.24

Based on Data of U.S.D.A.

MIGRATORY FARM LABOR



U. S. DEPARTMENT OF AGRICULTURE — BUREAU OF AGRICULTURAL ECONOMICS

The following figures show the total and seasonal employment in agriculture. (1945 data)

Total farms	5,859,169
Persons Living on Farms	
Oct. 1, 1945	26,490,000
Average persons per farm	4.5
Persons Engaged in Agriculture	9,844,000
Wage workers, July 1945	2,544,000
January 1945	1,434,000
Summer Increase of Wage Workers	1,110,000

A large proportion of farm labor is supplied by a great mass of migratory workers. It is estimated that there are now more than one million seasonal and migratory farm workers that move about following harvests and other peak demands for labor.

10% of the farms in this country produce over 50% of the farm produce that enters market channels. These commercial farms have peak labor requirements at certain seasons which create a great demand for seasonal and migratory laborers.

There are local seasonal workers that may be employed in towns, or in non-agricultural activities, most of the year. Such workers frequently go only short distances to pick cotton and tomatoes, and do other farm work during short seasons.

Other workers are almost constantly on the move. They tend to follow major routes of travel as illustrated by the above map. Most of these lines of travel are induced by the successive ripening of various crops. All along these routes workers join the movement and others drop out. Some obtain more lasting employment or are diverted to other areas. In some cases, such as sugar beets, the workers usually move only from the point of origin to the area of work and back again.

The thousands of homeless migratory farm laborers present special problems of housing, health, child and adult education, and relief. The Department of Agriculture has the responsibility of channeling these workers to areas where they are needed, and eliminating, or at least easing, some of the above problems.

450 Income, Expenses, Taxes

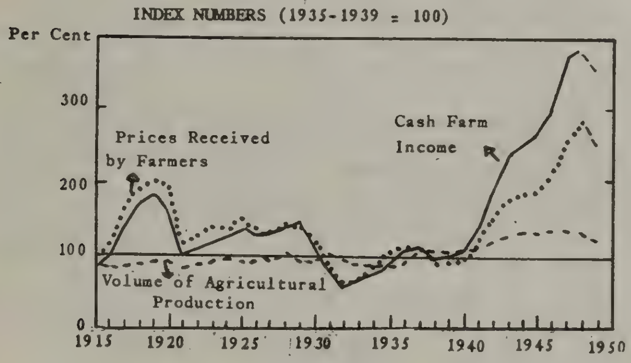
450 Income, Expenses, Taxes

PRODUCTION AND PRICES CONTROL FARM INCOME

Gross farm income is determined by what farmers have to sell and the price received. From 1915 to 1940 the total volume of things farmers produced for sale changed slowly. But, prices received were erratic and farm income bounced up and down like a rubber ball.

Because of this, the idea became prevalent that Farm Prices Control Farm Income. Since 1940 we have experienced a clear illustration of how farm production as well as prices contribute to total farm income.

FARM INCOME, PRICES AND PRODUCTION, U.S.
1915-1949



It is "time and place -- Supply and demand" that determine value. If you do not think so, try to figure the value of a 100 pound block of ice to an Eskimo in the winter time. Government regulations and controls cannot change the laws that determine value and set the limits of farm income. They can prevent them from operating freely (a high dam could be built across the Mississippi, but it would flood out all the land above and the water would eventually go over the top or find a way to go through or around).

These eternal laws of the universe will "make" those who work with them -- will "break" those who work against them. It is hard to find a better example of the latter than the case of the potato grower.

In 1948 with high price supports the government took the best potatoes and let the poor ones go to market. Should anyone be surprised that folks in town decided to cut their potato buying to a new low level. No one wants to pay a high price for "ornery" potatoes.

FOOD FACTS. The average family this year will use about 10 per cent more food than it did before the war. The main reason for this increased consumption is that farmers are producing that much more.

☞ Food production in the prewar years, 1935-39, was held to relatively low levels by severe drouth. It was also held down by government price-support programs which caused corn to accumulate rather than to be used for producing meat, milk, poultry, and eggs. (U. of Ill.)

Cotton farmers face something of the same problems as the potato farmers and right now the cotton industry is in a life and death struggle with synthetics. High support prices only hasten the day when a cotton dress becomes a "luxury garment" that only the rich can afford. A Texas rancher told us that "We Mohair producers priced ourselves out of the market. Now we have huge stocks and no place to go with them".

Government farm programs can be made to work according to the eternal economic laws. Levees along the Mississippi river protect those who live in the adjoining lowlands. And, a farm program that helps prevent extreme fluctuations in farm production and prices can serve as a levee to protect those in agriculture. (See Digest Pages 31 to 34).

THE FARM INCOME SITUATION

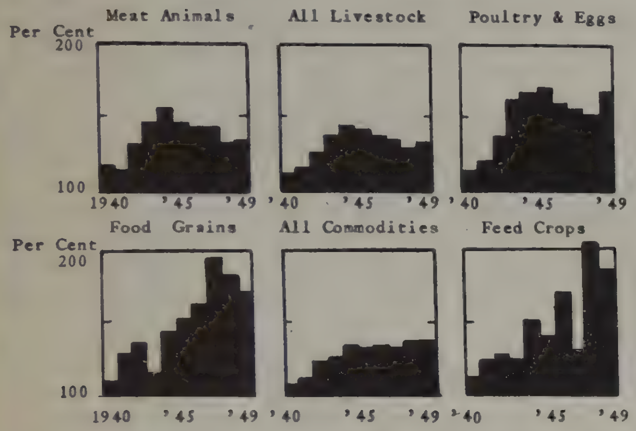
At the present time the price of farm products is dropping slowly -- production is about steady. In the first 7 months of 1949 cash farm income fell 10 per cent short of 1948. It will be down even more in the remaining months of the year. This is the first time since 1938, that farm income has fallen below the level of the previous year.

Following are six graphs showing the volume of production for various commodities. All livestock production, including meat animals, has tapered off slowly in the past five years, but prices have remained high. Now prices

PRODUCTION AND PRICES CONTROL FARM INCOME

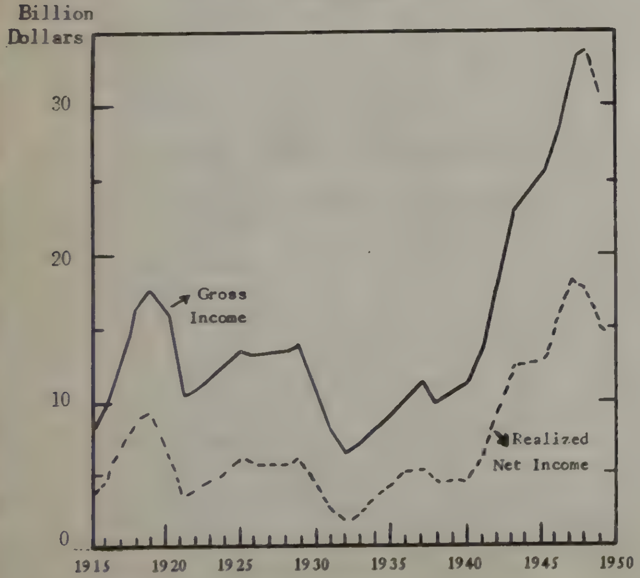
are dropping, but livestock production has started an upward trend. Result, income from livestock has remained relatively stable.

Volume Of Production For Sale And Home Consumption, 1930-1949
(Index numbers 1935-1939- 100)



Record production for food grains was attained in 1947. Prices dropped the following year. So did production. Both have continued their drop and farm income from this source has been cut. Feed crops had a record production year in 1948 and may equal this in 1949, when final crop reports are known. Prices have dropped considerably, but with continued high production, income loss has not been too great.

Gross Farm Income And Net Income, U.S.
1915-1949

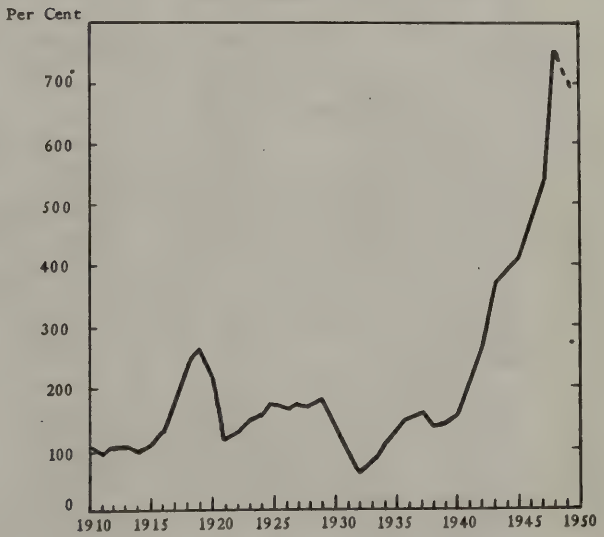


Net income of farmers is being cut more than gross income. Net income in 1949 is expected to be at least 15 per cent below that of 1948 or around 14.7 billion dollars. The difference between a farmer's gross income and his net income is his production expense. This expense will total about $16 billion in 1949 or 1½ times the total income of farmers before the war. Prices received by farmers have dropped 19 per cent since their peak in January 1948, but prices paid by farmers have dropped only 3 per cent from the August 1948 peak.

The graph shows the trend of both gross and net income since 1915. The spread between the two lines indicates the total production expenses each year.

Because of inflated prices and record production, the years since 1940 have been prosperous ones for the farmer. He has been able to make long-needed improvements, buy new equipment and put some money in the bank. His average net income, for the first time, reached the level of wages received by employed industrial workers -- slightly more than $200 a month. His net income per year is up 6½ times since 1910. The graph below shows the progress the farmer's net income has made.

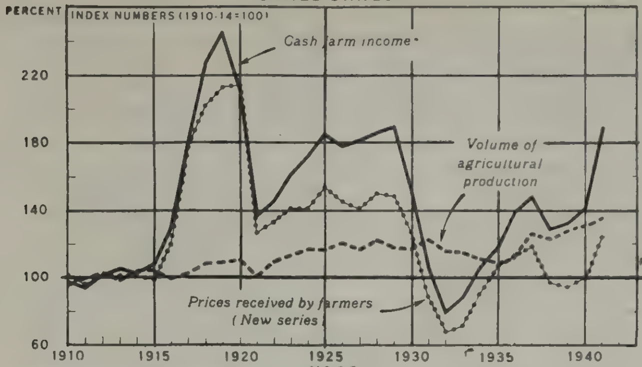
Average Income Of Agricultural Workers, U.S.
1910-1949
Index Numbers (1910-1914=100)



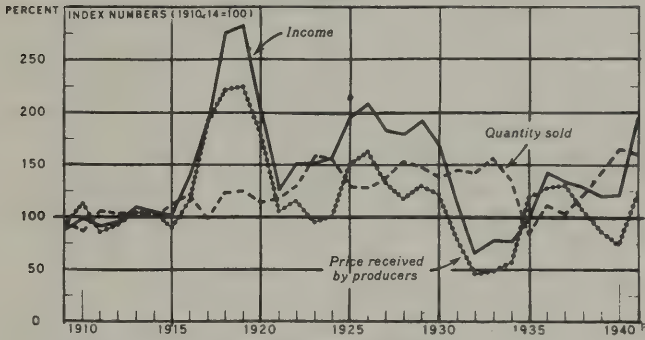
In 1949 the trend of net farm income is again downward. Since the war the number of persons working in agriculture has increased slightly and now, with more industrial lay offs, others are returning to farming. See page 871-872. This, coupled with lower prices and incomes, will help to pull down the average income of farm workers in the future.

PRICES CONTROL FARM INCOME

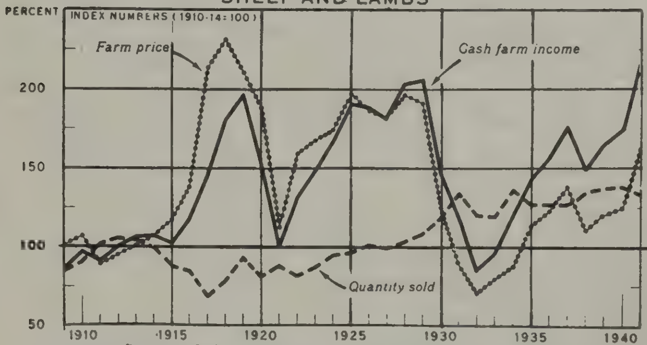
UNITED STATES



HOGS

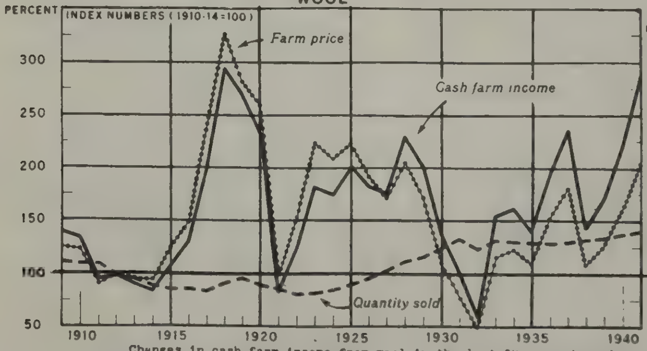


SHEEP AND LAMBS



Because of the upward trend in demand for lamb, the income from sheep and lambs in recent years has been relatively higher than for most other farm products.

WOOL



Changes in cash farm income from wool in the last 30 years have been closely associated with changes in wool prices. As the United States has long imported wool, domestic prices of wool are affected largely by world supply and demand conditions.

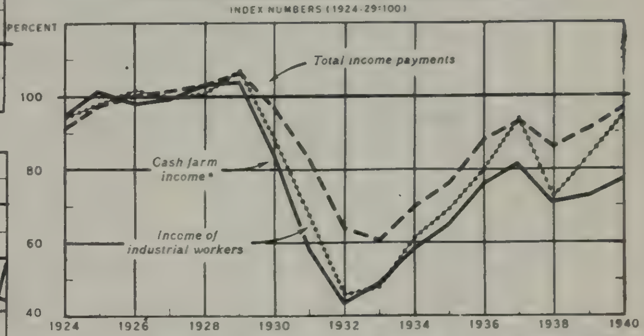
U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

ALTHOUGH CHANGES IN THE CASH FARM INCOME ARE THE RESULT OF CHANGE IN BOTH PRICES RECEIVED AND QUANTITIES SOLD, THE FARM INCOME AS A WHOLE TENDS TO FOLLOW CLOSELY CHANGES IN PRICES. THE APPARENT LACK OF CONTROL OF QUANTITY OF PRODUCTS SOLD IS STRIKINGLY BROUGHT OUT IN THE GRAPH SHOWING UNITED STATES TOTALS. TOTAL PRODUCTION HAS INCREASED GRADUALLY TO ALMOST 40 PER CENT ABOVE THE 1910 LEVEL. CASH INCOME HAS VARIED GREATLY AND FLUCTUATED OVER A RANGE OF NEARLY 165 PERCENT IN THE SAME PERIOD.

THE EXTENT TO WHICH THIS IS ALSO TRUE IN THE CASE OF INDIVIDUAL PRODUCTS IS SHOWN BY OTHER GRAPHS ON THIS PAGE.

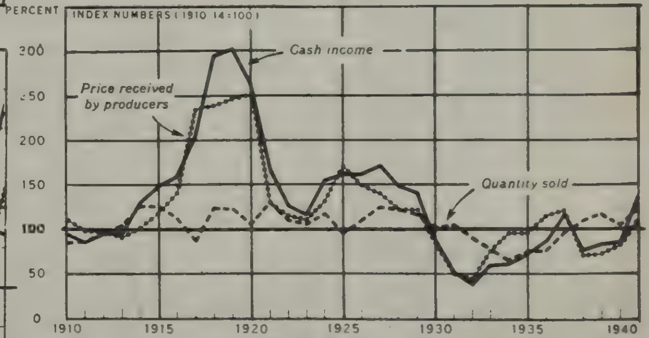
FOR INDIVIDUAL FARMS OR LIMITED AREAS THE QUANTITY OF PRODUCTS SOLD MAY PRIMARILY CONTROL THE AMOUNT OF INCOME FROM YEAR TO YEAR — HENCE PROFITS. BUT WHEN PRODUCTION IS RELATIVELY STABLE INCOME FLUCTUATES WITH PRICES.

CASH FARM INCOME INCOME OF INDUSTRIAL WORKERS. AND INCOME PAYMENTS. UNITED STATES. 1924-40



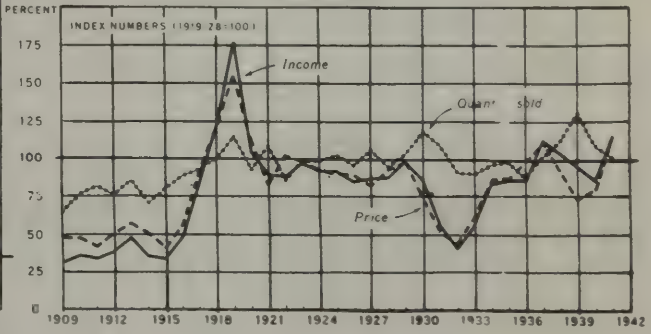
MANY FACTORS OTHER THAN QUANTITIES MARKETED ARE ALSO IMPORTANT IN DETERMINING PRICES AND HENCE INCOME. AMONG THESE, CHANGES IN THE PURCHASING POWER OF CONSUMERS ARE A PRINCIPAL FACTOR. THEREFORE THERE IS A CLOSE RELATION BETWEEN INCOME OF INDUSTRIAL WORKERS AND CASH FARM INCOME. SEE DIGEST PAGE 21.

WHEAT



In only a few years does it appear that prices for wheat in the United States react directly oppositely to quantities sold. Prices received by producers are affected more by world supplies and general price-level movements than by the quantities of wheat for sale in the United States.

TOBACCO



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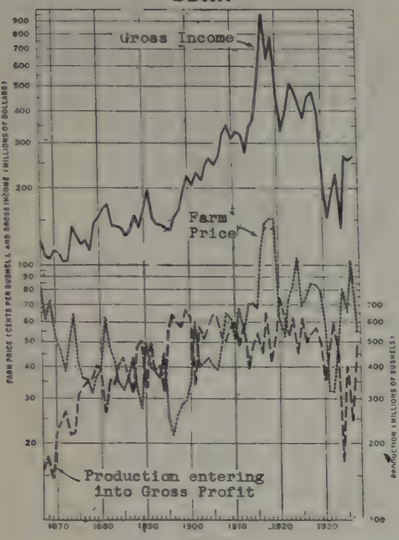
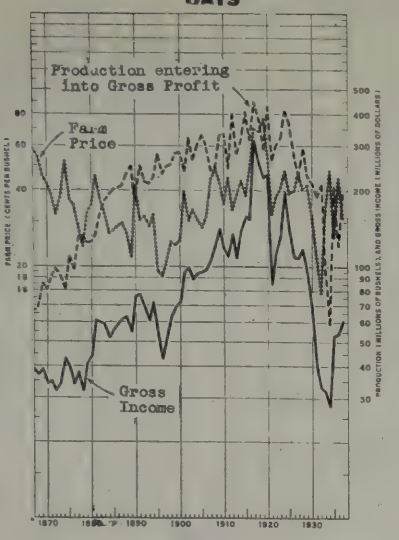
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12 Mo.

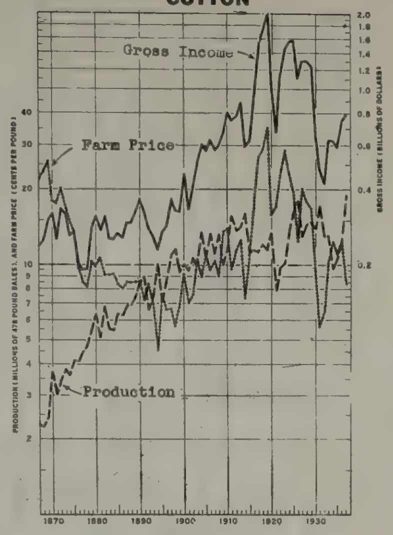
PRODUCTION, FARM PRICE, GROSS INCOME



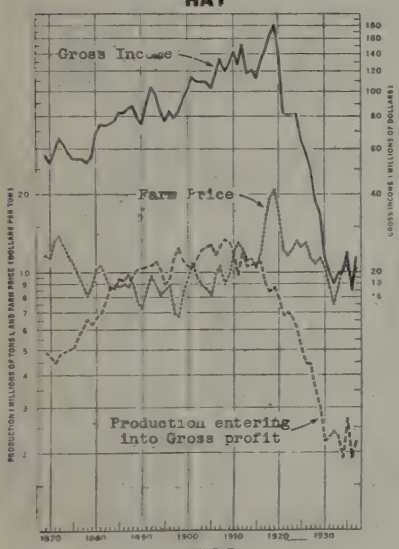
CORN



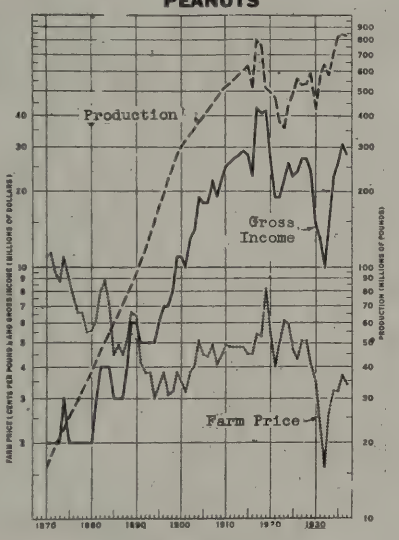
OATS



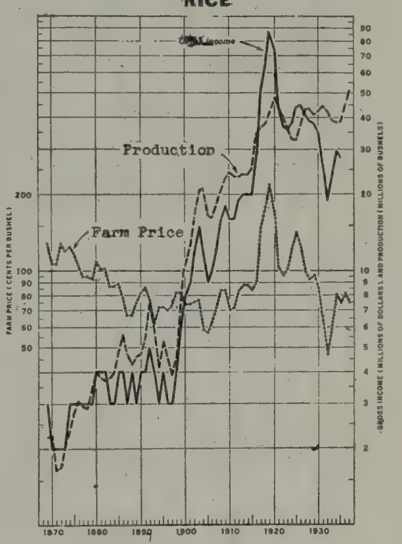
COTTON



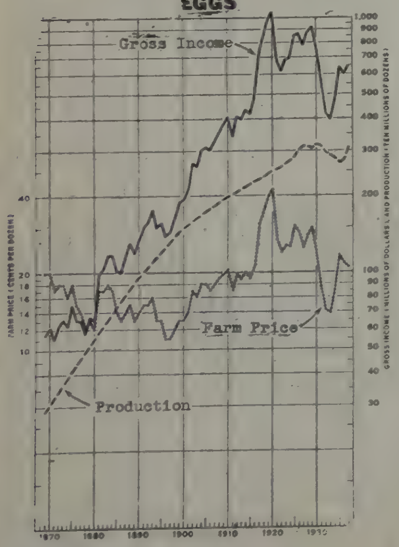
HAY



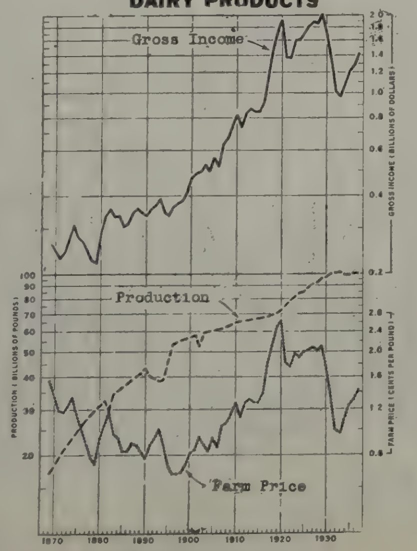
PEANUTS



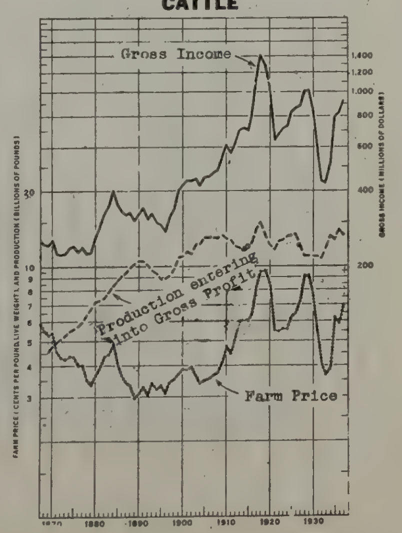
RICE



EGGS



DAIRY PRODUCTS

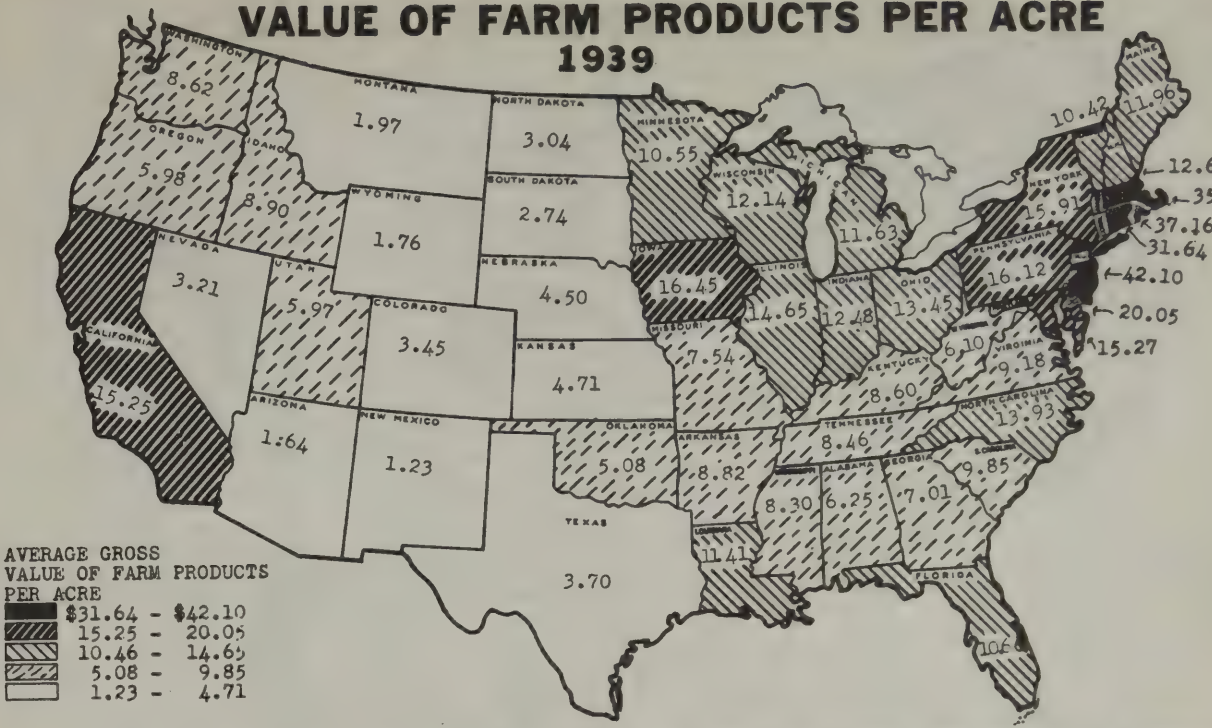


CATTLE

ALL DATA FOR YEARS 1869 to 1937

AE - Technical Bulletin 703

VALUE OF FARM PRODUCTS PER ACRE
1939



The most profitable agricultural industry is not always found in the areas of highest per acre production. Usually the volume or value of farm products per farm is a more accurate guide if only one factor is relied upon. Although high per-acre income is important and often necessary, its beneficial effect can, in large measure be offset by farms too small to give an adequate gross volume of production.

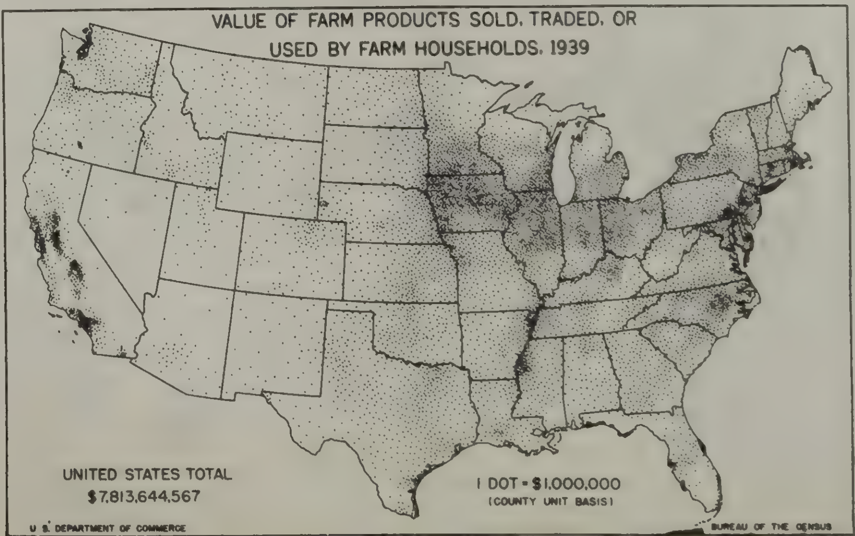
This map should be studied along with the one showing the value of farm products per farm. (Page 262) Some states rank relatively high in both cases. Others reveal that farmers have rather definitely overcome low per-acre production with larger farms. Still other states rank low in both maps.

The figure in each state shows the average value of farm products produced per acre in 1939, including both those products used and those sold.

Both productive soils and intensive types of farming are reflected in the high per-acre production shown by some states.

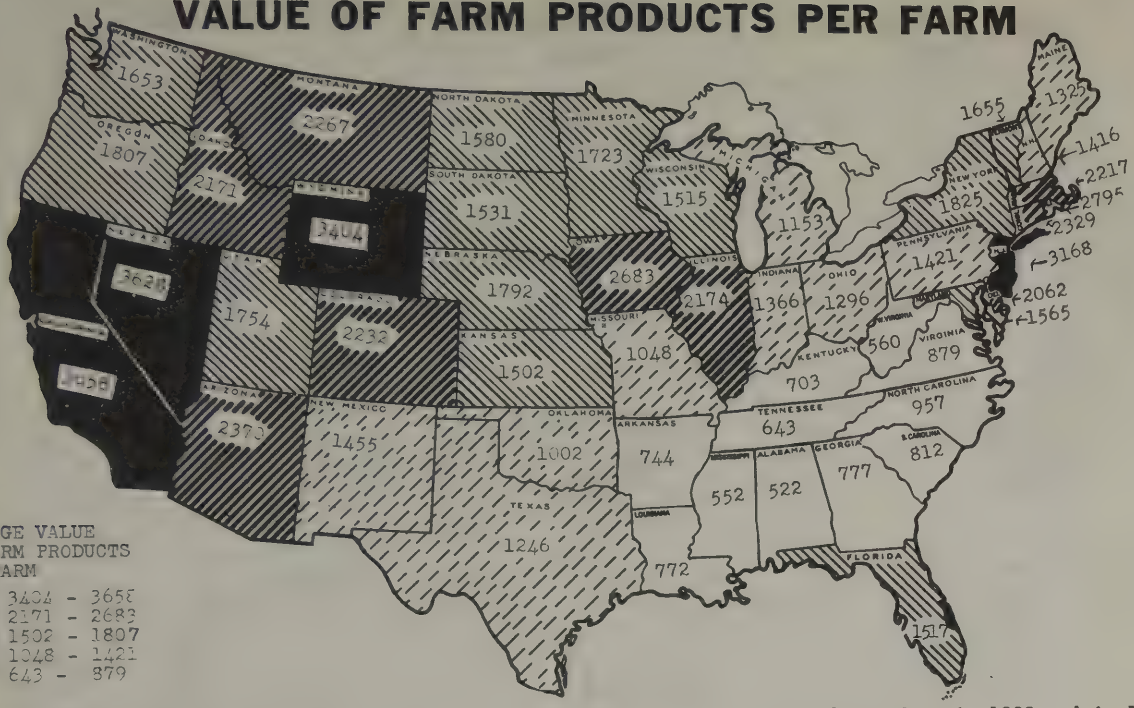
The contrast between the high rainfall areas of the East and the low rainfall regions of the West is very apparent.

As these figures are based on the land rated as farm land, some western states show relatively large per-acre production where irrigation is practiced on any considerable acreage.


VALUE OF FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS, 1939

U. S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS

VALUE OF FARM PRODUCTS PER FARM



The figure in each state shows the value of farm products produced per farm in 1939 and includes both those products used and those sold.

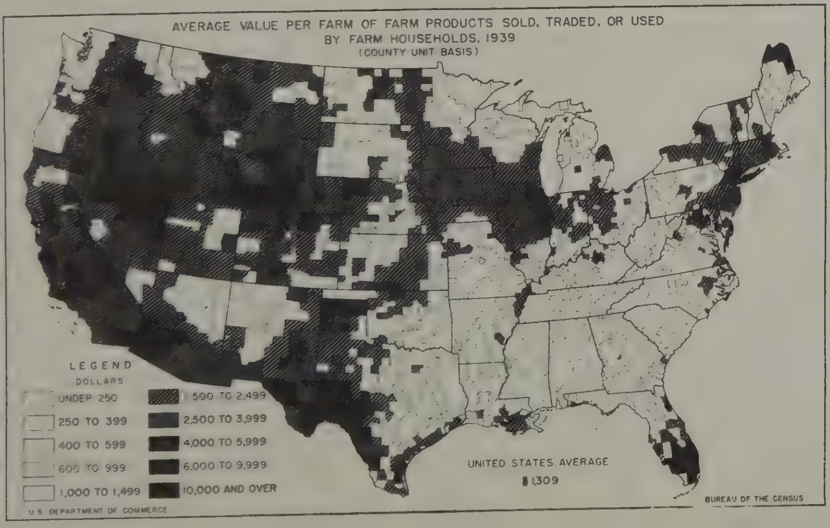
In many of the western states the low productivity per acre has been more than off-set by large acreages per farm or ranch. Hence the production per farm or ranch, which is the operating unit, is much higher for some western states than for most states of other regions.

The figures for the southern states are smaller than they would be otherwise because the cropper land units were counted as farms. On a plantation basis, all of the southern states would rank much higher in production per farm or plantation unit.

It is important, however, to see the contrast in the return per man which this map tends to reflect.

Territories should not be judged as much from the level of production per acre as from the effectiveness with which the farm units are adapted to proper economic use. Detailed studies show that many areas are still far from having farms of the size and type to permit a satisfactory land return. Such areas will prove to be inferior investment and trade territories until at least the most acute situations are corrected.

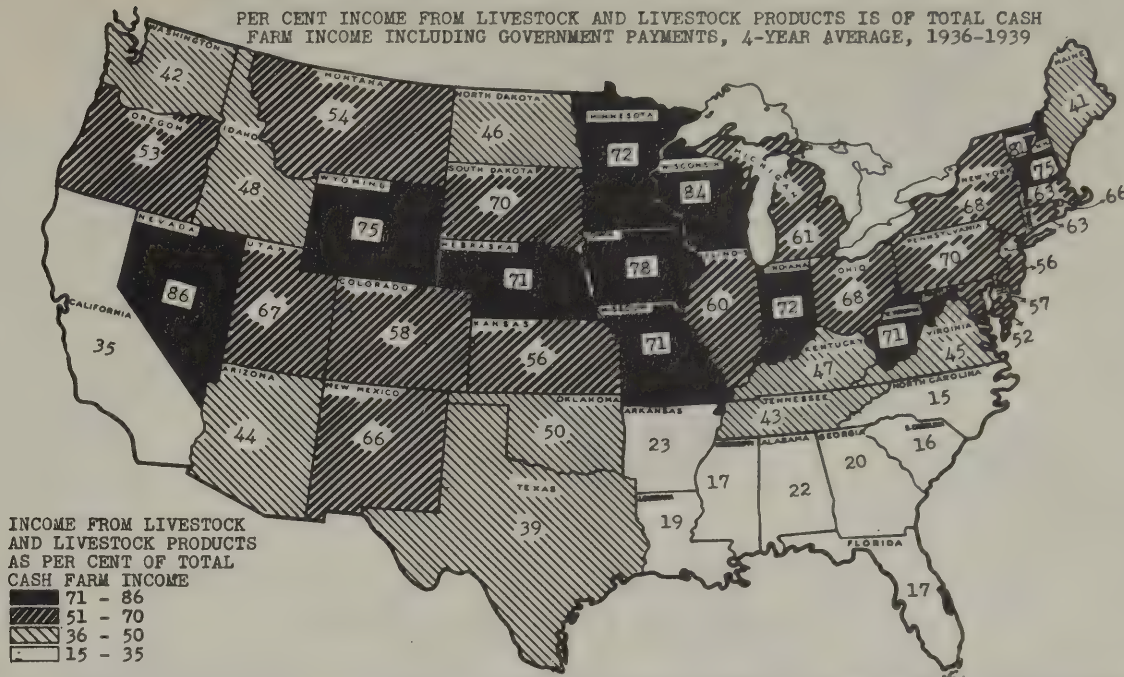
Net income is closely correlated with the gross value of production per farm. Little can be had for paying debts, and purchasing conveniences and even some necessities where the gross production per farm falls to the low level shown for a number of states.



U.S.D.A. Data

SOURCE OF CASH FARM INCOME

PER CENT INCOME FROM LIVESTOCK AND LIVESTOCK PRODUCTS IS OF TOTAL CASH FARM INCOME INCLUDING GOVERNMENT PAYMENTS, 4-YEAR AVERAGE, 1936-1939



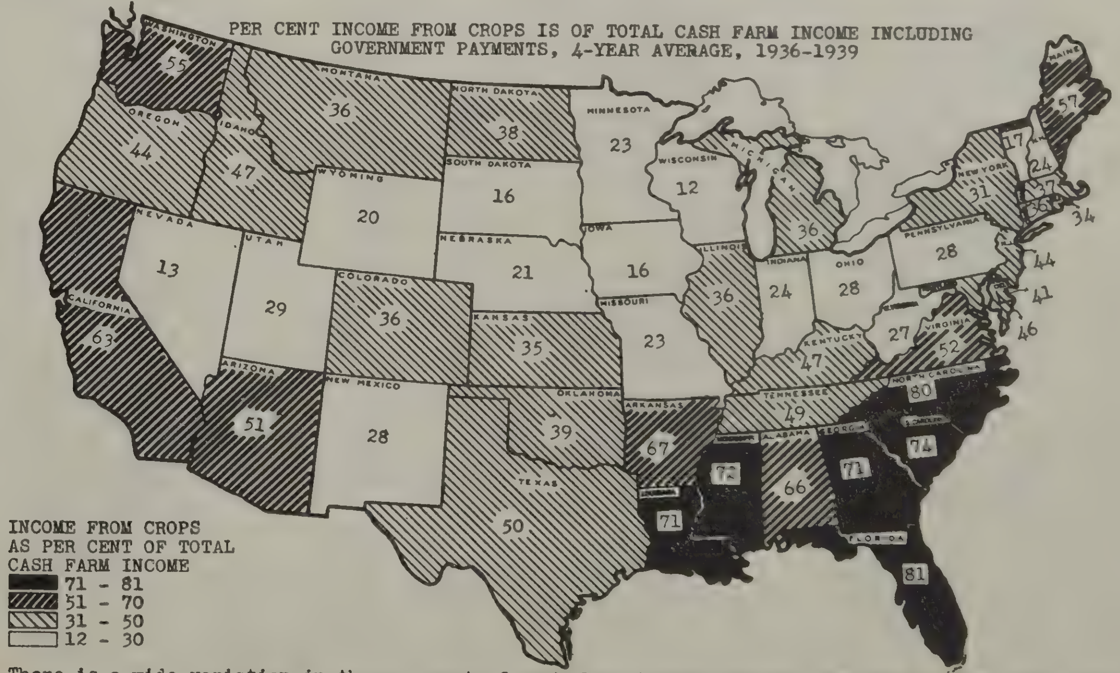
INCOME FROM LIVESTOCK
AND LIVESTOCK PRODUCTS
AS PER CENT OF TOTAL
CASH FARM INCOME
■ 71 - 86
▨ 51 - 70
▧ 36 - 50
□ 15 - 35

The Corn Belt ranks first in per cent of income from livestock and livestock products. Next are the dairy areas and the range livestock areas of the west.

Livestock and livestock products are by far the primary source of cash farm income for the farmer of the United States. The comparative figures, 4-year average, 1936-1939, are as follows:

Source	United States Total	Percentage
Livestock and Livestock Products	$4,615,324,000	53.9
Crops	3,454,280,000	40.4
Government Payments	485,859,000	5.7
TOTAL	$8,555,463,000	100.0

PER CENT INCOME FROM CROPS IS OF TOTAL CASH FARM INCOME INCLUDING GOVERNMENT PAYMENTS, 4-YEAR AVERAGE, 1936-1939



INCOME FROM CROPS
AS PER CENT OF TOTAL
CASH FARM INCOME
■ 71 - 81
▨ 51 - 70
▧ 31 - 50
□ 12 - 30

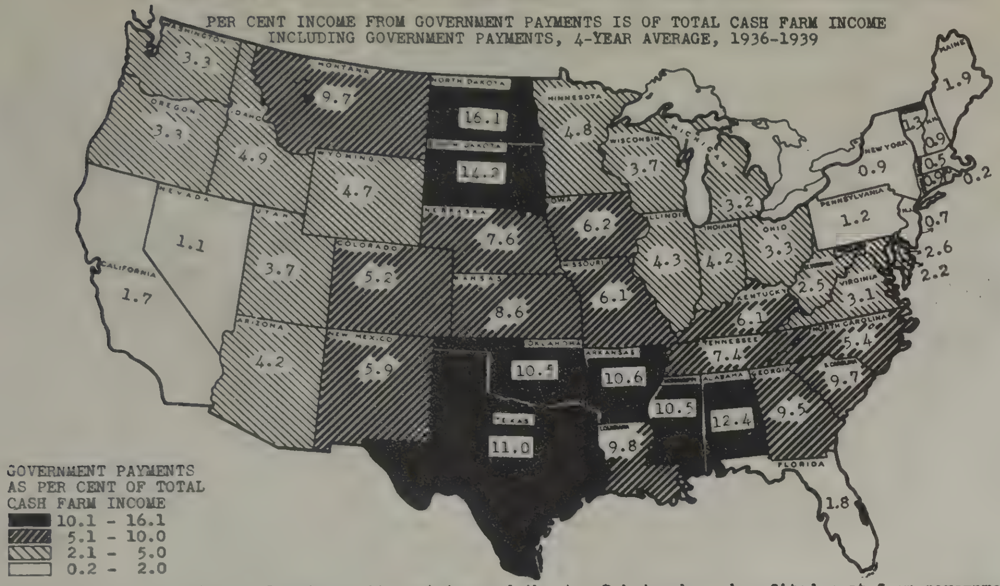
There is a wide variation in the per cent of cash farm income derived from crops - from a low of 12 per cent in Wisconsin, to a high of 81 per cent in Florida. The Cotton Belt is the primary cash crop area. Western fruit and cotton states of California and Arizona rank next. Wheat producing states such as Kansas, North Dakota, and the northwest states receive 1/3 to 1/2 of their cash farm income from crops.

Based on Data of U.S.D.A.

DOANE AGRICULTURAL DIGEST 1940

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

SOURCE OF CASH FARM INCOME


PER CENT INCOME FROM GOVERNMENT PAYMENTS IS OF TOTAL CASH FARM INCOME INCLUDING GOVERNMENT PAYMENTS, 4-YEAR AVERAGE, 1936-1939

On a percentage basis the leading cotton states and the two Dakotas have benefited most from government payments. The New England States have had the smallest benefits. The variations are from less than 1 per cent in some states to over 16 per cent in North Dakota.

SOURCE OF CASH FARM INCOME

Based on 4-Year Average, 1936-1939

State	Source of Cash Income in %: Crops	Source of Cash Income in %: Livestock and L. S. Products	Source of Cash Income in %: Government Payments	Total Income Including Gov't. Payments	% of Total Cash Income by Livestock Enterprise: Sheep, Lambs Mutton and Lamb	% of Total Cash Income by Livestock Enterprise: Hogs, Pork and Lard	% of Total Cash Income by Livestock Enterprise: Dairy * Products	% of Total Cash Income by Livestock Enterprise: Cattle & Calves, Beef & Veal
Maine	57.3	40.8	1.9	$ 55,848,000	0.2	2.2	22.1	3.8
New Hampshire	23.7	75.4	0.9	21,962,000	0.1	1.6	34.2	6.0
Vermont	17.5	81.2	1.3	38,972,000	0.1	1.9	61.5	8.8
Massachusetts	36.8	62.7	0.5	74,272,000	0.0	3.7	32.1	3.5
Rhode Island	33.9	65.9	0.2	9,842,000	0.1	2.0	41.0	4.9
Connecticut	35.9	63.2	0.9	53,224,000	0.0	0.8	38.0	3.7
New York	30.7	68.4	0.9	310,736,000	0.4	1.4	44.5	6.7
New Jersey	43.6	55.7	0.7	98,965,000	0.0	1.8	28.4	3.5
Pennsylvania	28.5	70.3	1.2	271,072,000	0.4	4.6	36.1	7.6
Ohio	28.2	68.5	3.3	339,687,000	2.2	18.4	20.6	11.1
Indiana	24.1	71.6	4.2	282,069,000	1.8	27.5	15.5	13.9
Illinois	35.9	59.8	4.3	519,405,000	1.2	19.6	13.9	16.2
Michigan	35.6	61.2	3.2	230,421,000	2.3	7.3	28.1	10.1
Wisconsin	11.8	84.5	3.7	310,576,000	0.7	12.3	48.0	12.3
Minnesota	23.0	72.2	4.8	358,722,000	2.1	19.5	24.1	15.3
Iowa	15.7	78.1	6.2	596,975,000	1.7	31.4	11.2	23.6
Missouri	23.3	70.6	6.1	267,542,000	2.5	20.1	12.8	23.0
North Dakota	38.1	45.8	16.1	116,989,000	2.5	6.6	13.8	13.8
South Dakota	16.4	69.4	14.2	116,002,000	3.9	18.7	12.7	22.4
Nebraska	21.4	71.0	7.6	258,065,000	2.9	18.8	8.9	31.3
Kansas	35.1	56.3	8.6	289,303,000	1.5	8.0	10.3	26.5
Delaware	40.8	56.6	2.6	19,267,000	0.0	1.7	14.7	3.0
Maryland	46.2	51.6	2.2	70,804,000	0.5	3.9	25.6	6.3
Virginia	51.8	45.1	3.1	124,314,000	1.7	5.4	12.9	8.6
West Virginia	26.6	70.9	2.5	42,333,000	5.3	5.7	23.2	19.0
North Carolina	79.6	15.0	5.4	244,824,000	0.1	3.8	5.0	2.1
South Carolina	74.3	16.0	9.7	110,772,000	0.0	4.2	5.9	2.7
Georgia	70.8	19.7	9.5	164,796,000	0.0	5.8	6.5	3.2
Florida	80.9	17.3	1.8	117,175,000	0.0	3.4	7.1	2.9
Kentucky	46.9	47.0	6.1	157,551,000	4.0	8.7	10.9	13.1
Tennessee	49.5	43.1	7.4	135,752,000	1.2	9.3	12.0	10.6
Alabama	66.1	21.5	12.4	128,155,000	0.0	5.8	6.0	4.7
Mississippi	72.2	17.3	10.5	180,220,000	0.0	3.4	6.3	4.6
Arkansas	66.6	22.7	10.6	154,693,000	0.1	6.3	6.1	5.6
Louisiana	71.2	19.0	9.8	131,676,900	0.1	5.4	5.1	5.6
Oklahoma	39.2	50.3	10.5	182,812,000	0.7	6.0	12.5	21.9
Texas	49.9	39.1	11.0	558,144,000	1.8	3.3	8.1	16.4
Montana	36.1	54.2	9.7	89,009,000	9.5	2.0	9.3	20.4
Idaho	46.8	48.3	4.9	97,035,000	10.6	5.4	12.3	10.0
Wyoming	19.9	75.4	4.7	48,658,000	19.0	1.2	6.7	30.4
Colorado	36.5	58.3	5.2	136,219,000	11.5	3.8	8.3	26.5
New Mexico	28.2	65.9	5.9	52,357,000	8.6	2.5	8.1	46.5
Arizona	51.3	44.5	4.2	56,491,000	2.9	0.6	7.1	26.8
Utah	28.8	67.5	3.7	46,393,000	11.9	2.9	13.1	12.7
Nevada	12.9	86.0	1.1	12,795,000	14.0	1.8	12.1	38.8
Washington	55.1	41.6	3.3	153,099,000	1.7	3.1	17.7	6.6
Oregon	44.0	52.7	3.3	111,295,000	5.9	4.1	17.7	12.2
California	63.0	35.3	1.7	608,161,000	2.2	1.8	13.2	8.9
United States	40.4	53.9	5.7	$8,555,463,000				

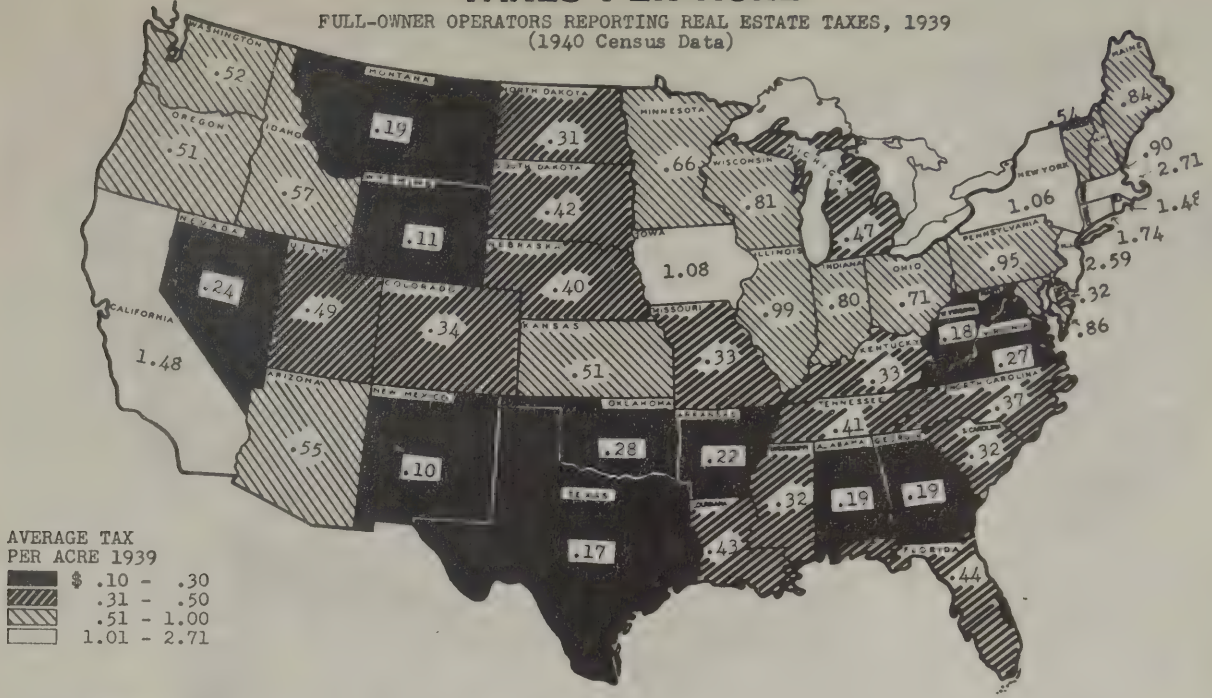
U.S. TOTAL - By Percentage	
CROPS	%
Cotton Lint 7.65 Cotton Seed 1.23	8.88
Wheat	5.40
Truck Crops	4.26
Tobacco	3.27
Corn	3.16
Others	2.30
Potatoes	2.04
Citrus Fruits	1.38
Apples	1.12
Hay	0.91
Sugar Beets	0.62
Oats	0.58
Grapes	0.49
Dry Edible Beans	0.48
Barley	0.47
Peaches	0.47
Strawberries	0.45
Peanuts	0.44
Other Fruits	0.43
Soybeans	0.41
Rice	0.38
Sweetpotatoes	0.26
Sugarcane for Sugar	0.21
Tree Nuts	0.21
Pears	0.18
Flaxseed	0.17
Rye	0.15
Clover Seed (Red and Alsike)	0.14
Small Fruits	0.13
Alfalfa Seed	0.12
Cherries	0.10
Grain Sorghums	0.08
Hops	0.08
Cranberries	0.07
Sugarcane Sirup	0.07
Cowpeas	0.06
Lespedeza Seed	0.05
Maple Sugar and Sirup	0.04
Sorgo Sirup	0.04
Sweetclover Seed	0.02
Timothy Seed	0.02
Buckwheat	0.01
Total Crops	40.40
LIVESTOCK & L. S. PRODUCTS	
Dairy Products	16.77
Cattle & Calves	13.82
Hogs	10.45
Chicken Eggs	5.47
Chickens	2.77
Sheep & Lambs	2.05
Wool	1.08
Turkeys	0.74
Others	0.74
Total Livestock and Livestock Products	53.90
Government Payments	5.70
Total	100.00

*Based on 3-Year Average, 1937-39 (Variations from totals due to calculations not adjusted.)

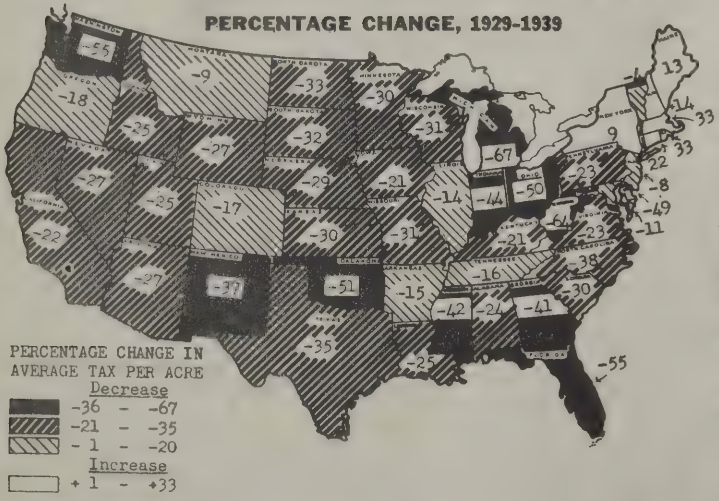
Based on Data of U.S.D.A.

TAXES PER ACRE

FULL-OWNER OPERATORS REPORTING REAL ESTATE TAXES, 1939
(1940 Census Data)



PERCENTAGE CHANGE, 1929-1939



The figures in each state shows the average tax per acre for owner-operated land. For taxes on all land see Digest pages 463 and 464.

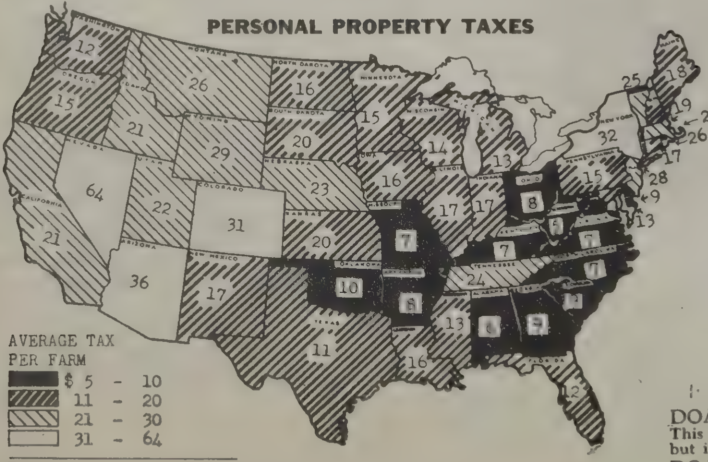
Taxes on owner-operated land, as would be expected, are higher than for all land. Note the following comparisons per acre.

	Owner-Operated	All Land
U.S. Average	52¢	39¢
Indiana	80	.53
Iowa	1.08	1.04
Texas	17	14
Mississippi	32	38

The average tax per acre on owner-operated land declined from 73¢ in 1929 to 52¢ per acre in 1939. For changes by states see the small map.

Between states there were marked changes over the 10-year period. There were increases in some New England States. Declines reached the extremes shown in Michigan of 67% and 64% in West Virginia.

PERSONAL PROPERTY TAXES



Based on Census Data

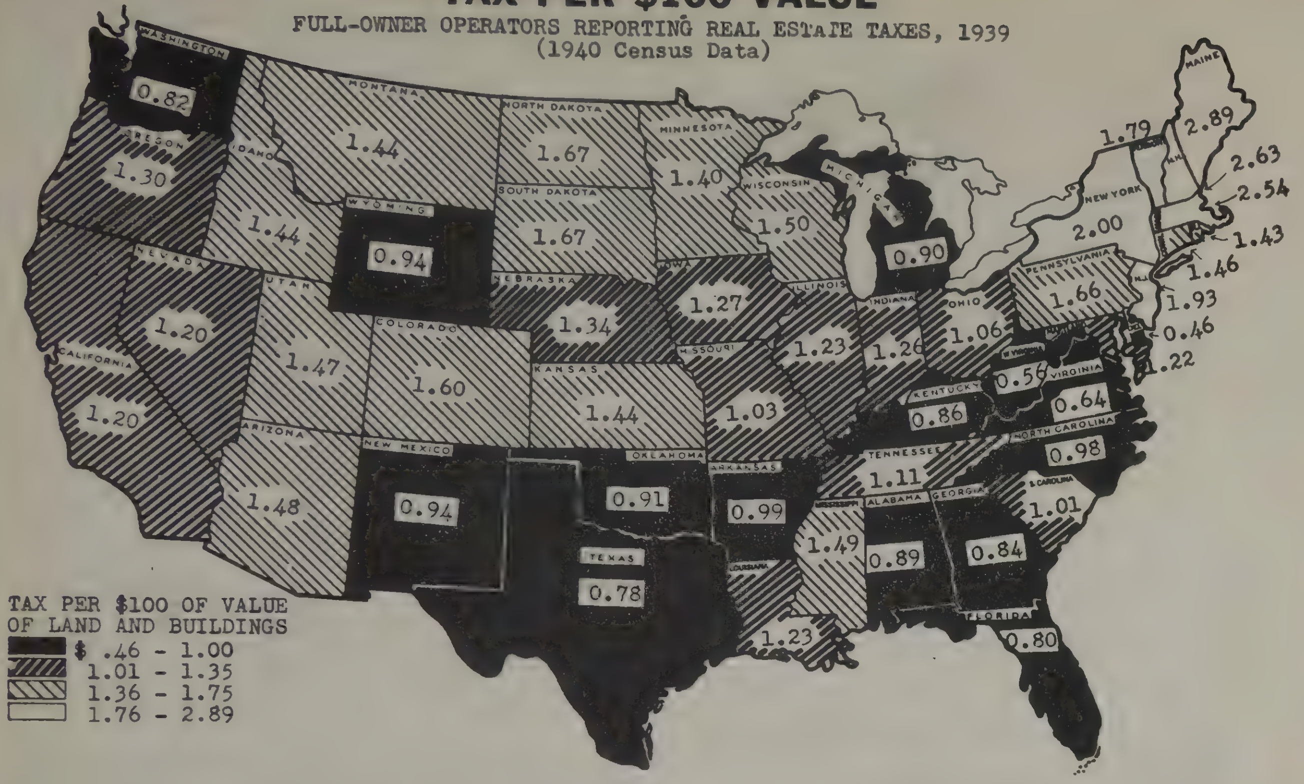
The bottom map shows the average amount of personal property tax per farm paid by full-owner operators.

The size of farm, type-of-farming, and rate of taxation exert a major influence on these figures. The average owner-operator in the Corn Belt pays about $17.00 personal property tax per year.

A comparison of this map with the large one at the top of the page shows clearly that most of the tangible property tax of farmers is the real estate tax.

TAX PER $100 VALUE

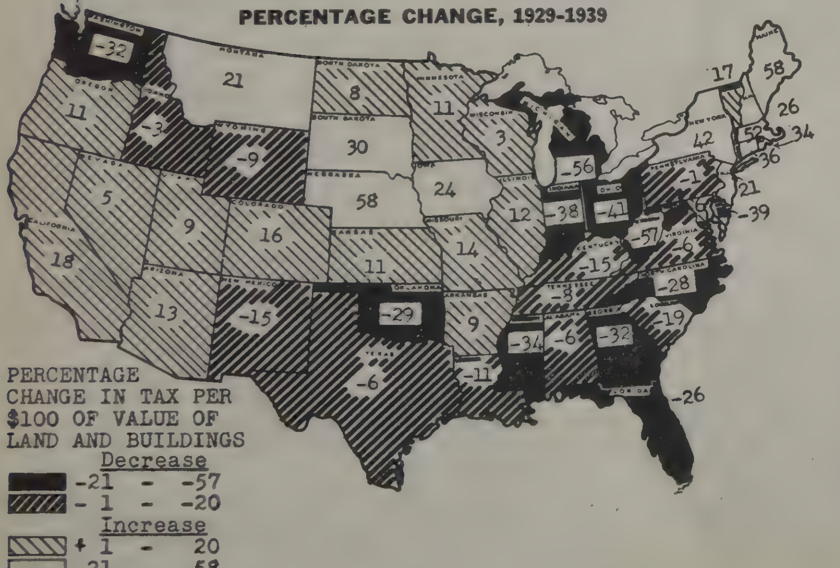
FULL-OWNER OPERATORS REPORTING REAL ESTATE TAXES, 1939
(1940 Census Data)



The figures in each state shows the average tax per acre for owner-operated land. 'For taxes on all land see Digest pages 463 and 464.

These figures are the result of checking with farmers on the actual amount of taxes paid for the year 1939. They are the ratio of taxes to value according to the data furnished by the farmers operating the farms.

Both rates of assessment and value estimates control the ratio as shown here.



Based on Census Data

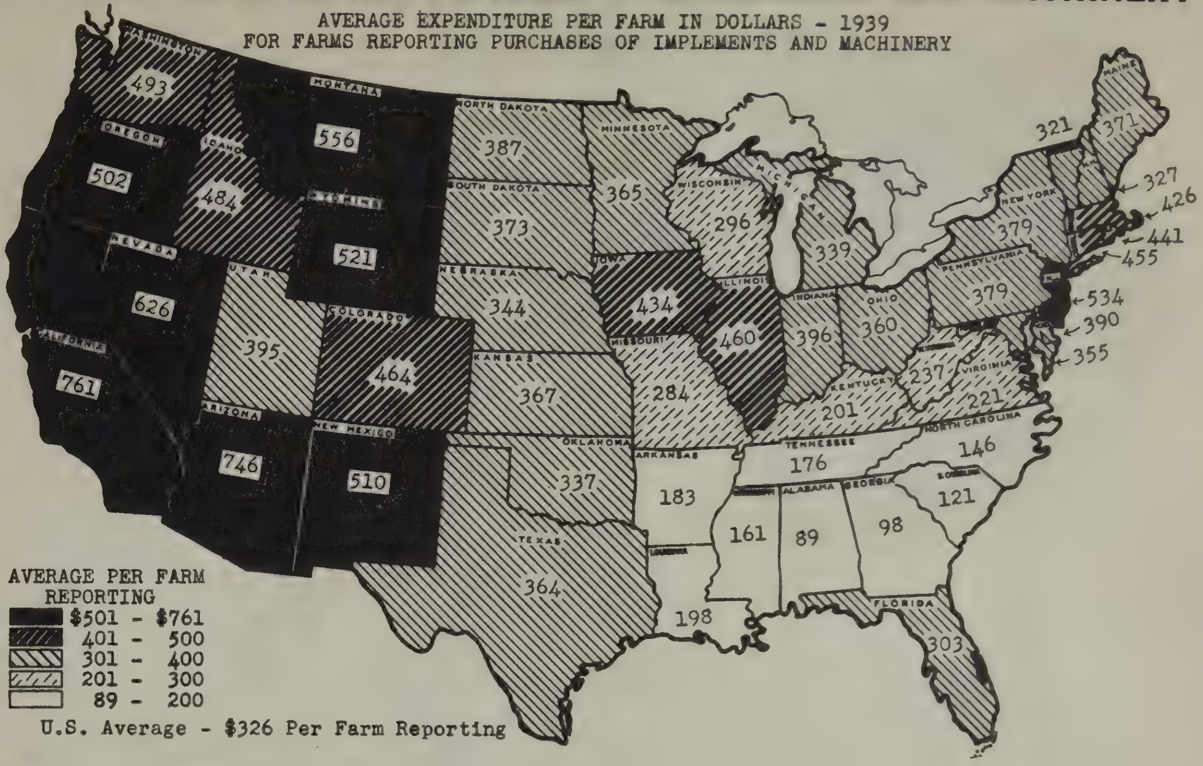
The small map shows the marked changes that have taken place in the past ten years. Large increases have taken place in the New England states and in some central and western states. Iowa 24%, Nebraska 58%, and Montana 21%.

Decreases have been the rule in most eastern and southern states.

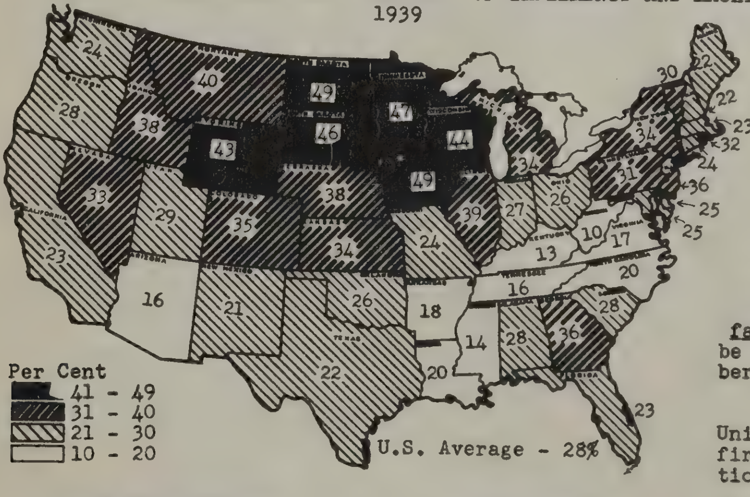
Taxes control a large part of the value of farm land, especially that value derived from capacity to produce income. Trends, therefore, are especially important to investors, both buyers of land and lenders with farm mortgages as security.

FARM EXPENDITURES — IMPLEMENTS AND MACHINERY

AVERAGE EXPENDITURE PER FARM IN DOLLARS - 1939
FOR FARMS REPORTING PURCHASES OF IMPLEMENTS AND MACHINERY



PER CENT OF FARMS REPORTING PURCHASES OF IMPLEMENTS AND MACHINERY
1939



The two maps reflect the extent to which farmers purchased farm implements and machinery including automobiles, motortrucks, and tractors in the year 1939.

The large map shows the average expenditure per farm reporting. For effective interpretation it should be considered with the data showing size of farms by states.

The small map shows the percentage of farms reporting purchases. This data should be considered along with data showing the number of farms in each state.

The following expenditure totals for the United States are of interest, especially the first two items which bear a definite relationship:

Farm Expenditures	Farms Reporting	U. S. Total	Average Per Farm Reporting
IMPLEMENTS and MACHINERY	1,686,609	$549,319,701	$326
GASOLINE, OIL, KEROSENE, etc.	2,886,614	323,238,707	112
CASH WAGES	2,260,237	781,791,558	346
BUILDING MATERIALS, FENCING, CEMENT, PAINT, etc.	1,980,108	305,650,336	154
FEED	3,342,715	732,116,548	219
COMMERCIAL FERTILIZER	2,337,031	195,927,959	84
LIMING MATERIALS	471,807	21,674,205	46

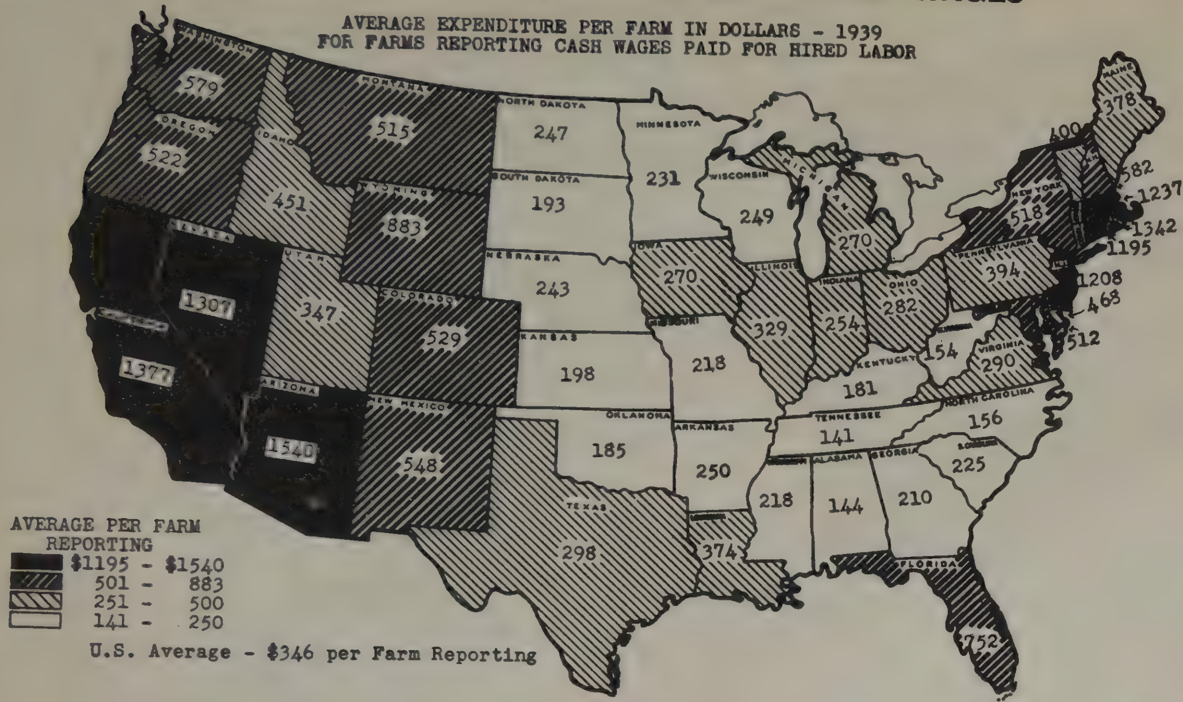
These items do not represent the total cash and other outlays of farmers. House rent and other perquisites for labor; custom work, such as threshing; rent paid for land; and crating and packing materials have not been included.

The following pages show more of these expenditures by states.

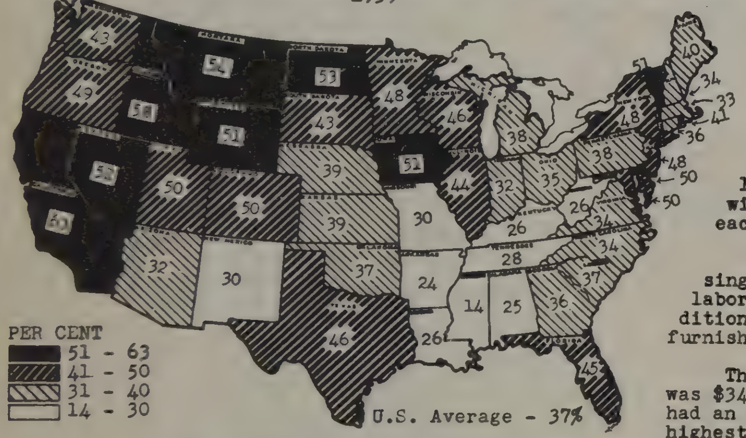
1940 Census Data

FARM EXPENDITURES— CASH WAGES

AVERAGE EXPENDITURE PER FARM IN DOLLARS - 1939
FOR FARMS REPORTING CASH WAGES PAID FOR HIRED LABOR



PER CENT OF FARMS REPORTING CASH WAGES PAID FOR HIRED LABOR
1939



The two maps reflect the extent to which farmers paid cash wages for hired labor in the year 1939.

The large map shows the average expenditure per farm reporting. For effective interpretation it should be considered with the data showing size of farms by states.

The small map shows the percentage of farms reporting cash wages paid for hired labor. This data should be considered along with data showing the number of farms in each state.

Cash wages paid for labor is the largest single expenditure of farmers. In 1939 the labor bill totaled $781,791,558 in cash. In addition many non-cash items of various kinds were furnished to the labor.

The U.S. average expenditure for cash wages was $346 per farm reporting wages paid. Arizona had an average expenditure of $1,540 per farm, the highest amount; Tennessee, $141, the lowest average expenditure for the 48 states. Most farms have no payroll to meet as they are primarily family enterprises and represent a "way of living". In September 1939, however, more than 1/4 of all persons working on farms were hired laborers.

California in 1939 led all other states in the amount of expenditures for cash wages, with over 1/7 of the total for the United States. California also reported the largest percentage of farms reporting cash wages paid for hired labor - 62.5 per cent.

Of the geographic divisions, the Pacific States had the highest percentage of farms reporting expenditures for cash wages, 54 per cent; and the East South Central had the lowest - only 23 per cent of the farms reporting cash wages paid for labor.

Of the farms reporting cash wages paid, less than 1/3 reported cash wages for monthly labor, most of the wages being for labor hired by day or week.

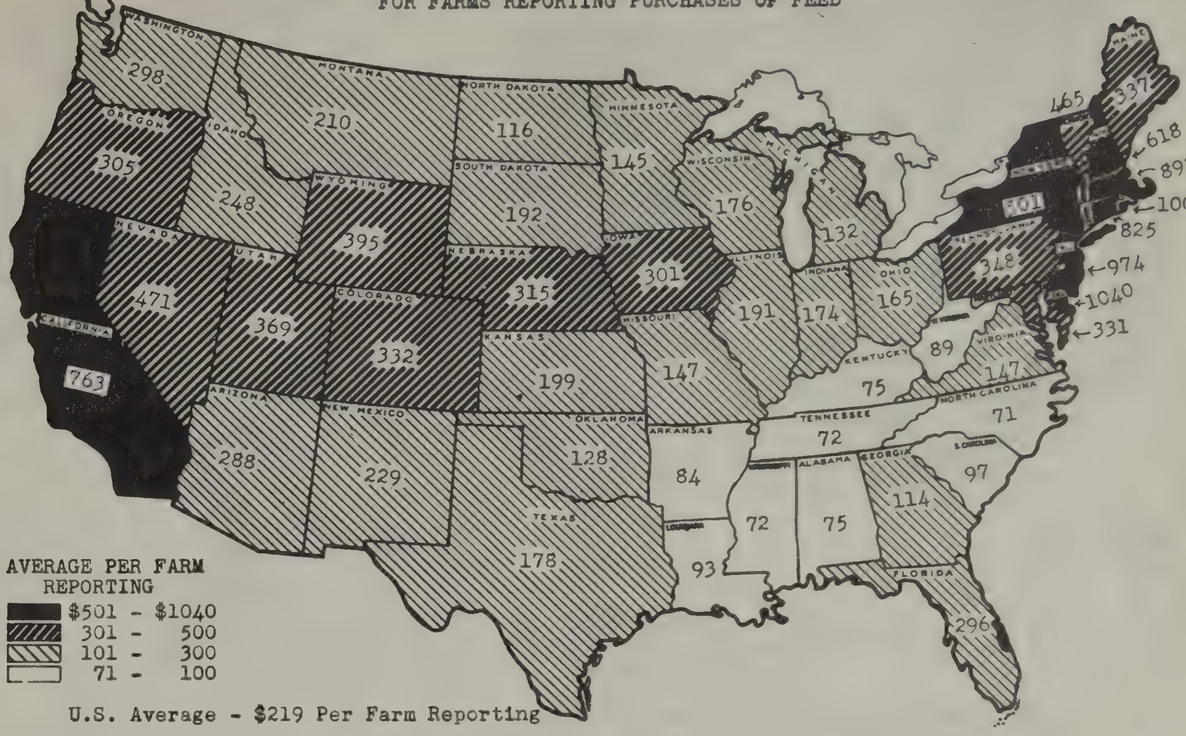
Farmers were less dependent on hired labor in 1940 than ten years earlier. In 1930, 41.8 per cent of all farms reported cash paid for labor while in 1940 only 37.1 per cent of the farms reported cash paid for labor during the year prior to April 1st. The expenditures per farm also declined from $363 per farm reporting to $346 per farm reporting in 1940.

It is probable that this reflects both the result of mechanization and improved equipment, as well as the economies imposed by the depression years intervening between 1930 and 1940.

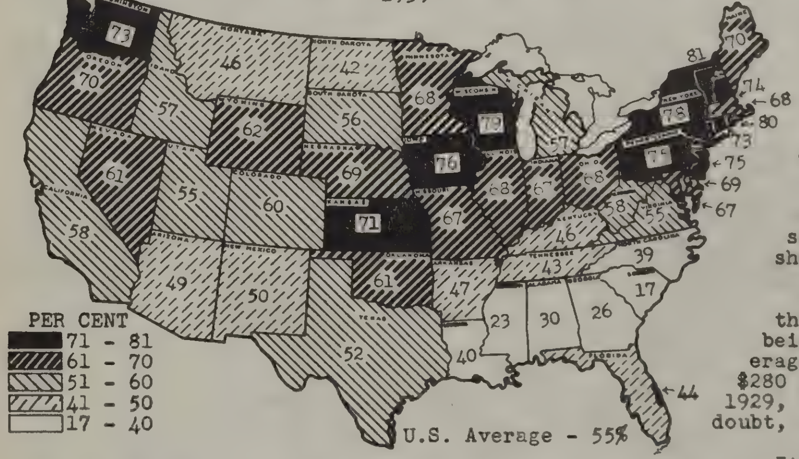
1940 Census Data

FARM EXPENDITURES—FEED

AVERAGE EXPENDITURE PER FARM IN DOLLARS - 1939
FOR FARMS REPORTING PURCHASES OF FEED



PER CENT OF FARMS REPORTING PURCHASES OF FEED
1939



The two maps reflect the extent to which farmers purchased feed in the year 1939.

The large map shows the average expenditure per farm reporting. For effective interpretation it should be considered with the data showing size of farms by states.

The small map shows the percentage of farms reporting purchases. This data should be considered along with other data showing the number of farms in each state.

More farmers were buying feed in 1939 than 10 years earlier, the percentages being 54.8 and 52.2 respectively. The average expenditure per farm declined from $280 per farm reporting feed purchases in 1929, to $219 per farm in 1939. This was, no doubt, the result of lower grain prices.

It is probable that there has been progressive education of farmers to the use of commercially mixed feeds and supplements causing the percentage of farmers buying feed to increase.

Expenditures for feed were almost as much as for labor, the totals for the United States being as follows:

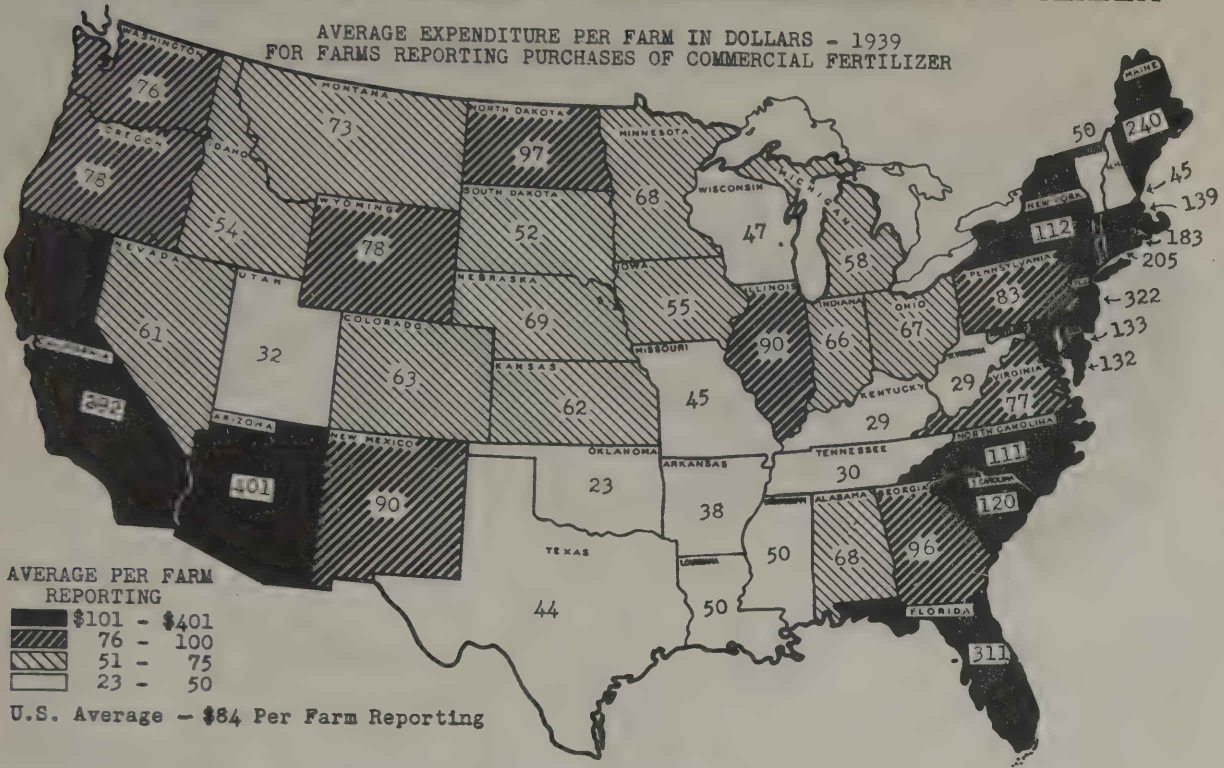
FEED	$732,116,548
CASH WAGES	$781,791,558

The West North Central division spent the most on feed in 1939 - $153,694,039 - and the East South Central States the least. The New England division reported the highest amount per farm reporting and the East South Central the least.

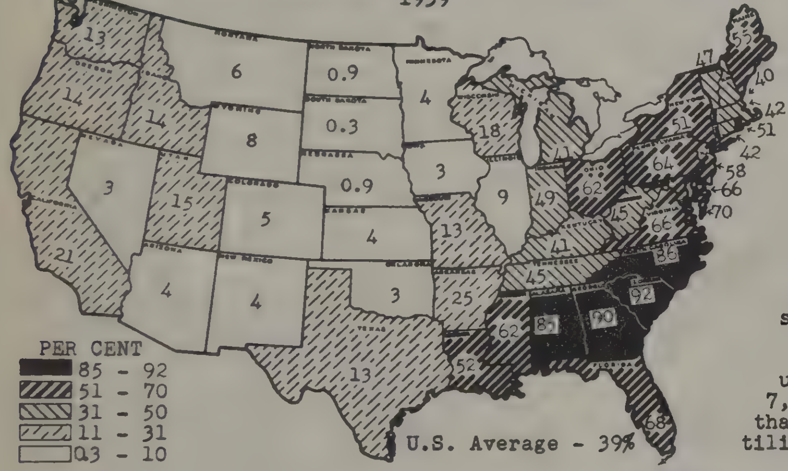
1940 Census Data

FARM EXPENDITURES — COMMERCIAL FERTILIZER

AVERAGE EXPENDITURE PER FARM IN DOLLARS - 1939
FOR FARMS REPORTING PURCHASES OF COMMERCIAL FERTILIZER



PER CENT OF FARMS REPORTING PURCHASES OF COMMERCIAL FERTILIZER
1939



The two maps reflect the extent to which farmers purchased commercial fertilizer in the year 1939.

The large map shows the average expenditure per farm reporting. For effective interpretation it should be considered with the data showing size of farms by states.

The small map shows the percentage of farms reporting purchases. This data should be considered along with other data showing the number of farms in each state.

The amount of commercial fertilizer used in the United States in 1939 was 7,003,826 tons which was 500,000 tons less than in 1929. The lime and commercial fertilizer used in 1939 were as follows:

	Tons	U.S. Expenditures
Commercial Fertilizer	7,003,826	$195,927,959
Lime Materials	8,516,107	21,674,205

More tons of liming material were used but the total cost was materially less due to low cost per ton of liming material.

The U.S. average expenditure for commercial fertilizer was $84 per farm reporting. Arizona had an average expenditure of $401 per farm, the highest for the 48 states; Oklahoma, $23, the lowest amount.

North Carolina in 1939 led all other states in the amount of expenditures for commercial fertilizer, with over 1/7 of the total for the United States.

Of the geographic divisions, the South Atlantic States in 1939 spent the most for commercial fertilizer or $88,359,431 - more than 3 times the amount spent in any other geographic division. The South Atlantic and East South Central divisions together spent more than half the total amount paid by farmers in the United States in 1939 for commercial fertilizer.

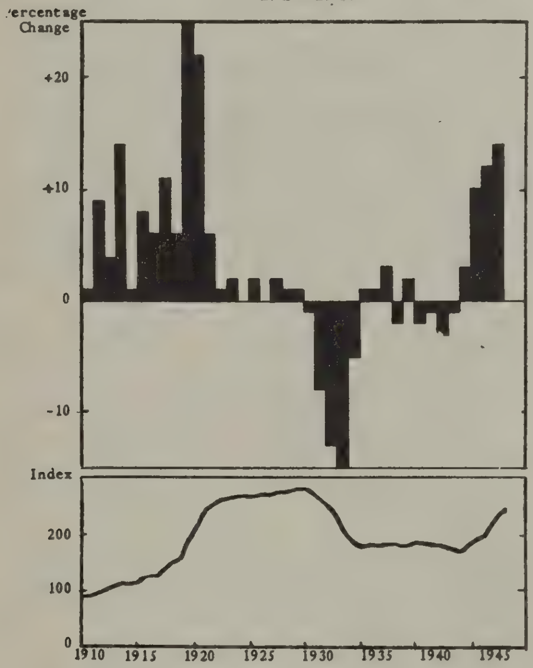
1940 Census Data

TAXES GOING UP — WILL STAY UP

The trend of farm real estate taxes has been upward since 1944, and will continue upward for several years. Farm real estate taxes per acre advanced 14 per cent from an index of 222 in 1946 to 254 in 1947 (1912-1914 - 100). This brings taxes per acre back up to the level of 1931, before the depression forced a shift to sales taxes and income taxes.

The chart shows the percentage change in farm real estate tax levies from year to year. Tax rates did not increase as rapidly this time as during the period following World War I. However, the same dollar level has been reached, as shown by the line on the bottom part of the chart.

Percentage Change from Previous Year
Farm Real Estate Taxes Per Acre, U.S.
and Trend of Farm Real Estate Taxes
1910-1947



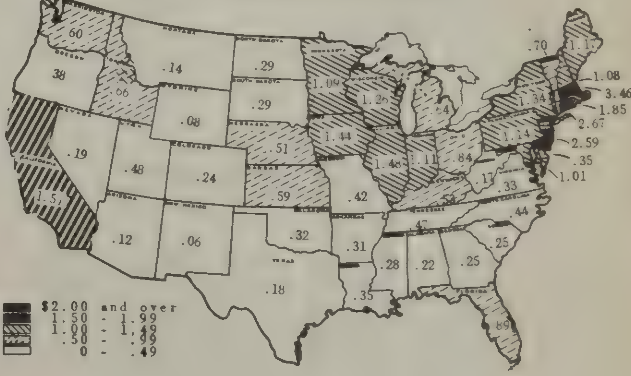
The maps show the wide variance between states in the amount of real estate taxes levied. The range in 1947 was from a low of six cents per acre in New Mexico to a high of $2.67 per acre in Connecticut. Low per acre tax rates are usually found in the range areas and regions with the least productive soils. High rates prevail in the more productive land areas and in the industrial states of the northeast. The U.S. average tax in 1947 was 53 cents per acre compared with 19 cents in 1910 and 58 cents in the peak years of 1928 and 1929.

Taxes increased to 96 cents per $100 of value in 1947. This is the first increase in taxes relative to real estate prices in nearly 10 years. Taxes per $100 of value are now at the 1922 level. In years when taxes per $100 of value fall, as in 1939-1944, the value of the land increases more than total real estate taxes paid. When taxes per $100 of value rise, real estate taxes rise relatively more than land values.

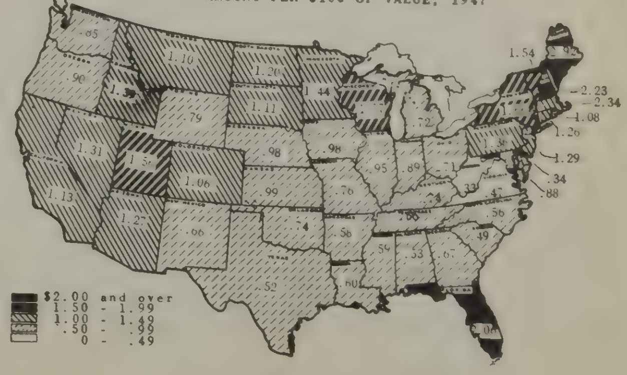
Taxes per $100 of value increased in 38 states during 1947. This was the result of tax rates increasing more rapidly than land prices in the year. Land values have now passed the peak of the war boom in most areas but tax rates are still going up. On an Illinois farm we appraised recently taxes had gone up 2½ times since 1944 (the assessed value was unchanged).

Taxes in 1947 were 4 per cent higher than in 1920 on a per acre basis. In many states tax levies were lower in 1947 than in 1920. The New England states show the largest increase. When comparing real estate taxes in 1920 and in 1947 per $100 of value, the percentage increase for the United States was 22 per cent. Land values were lower in many northern and western states in 1947 than in 1920. Thus, the increase in taxes per $100 of value is considerably greater than

TAX LEVIES ON FARM REAL ESTATE
AMOUNT PER ACRE, 1947



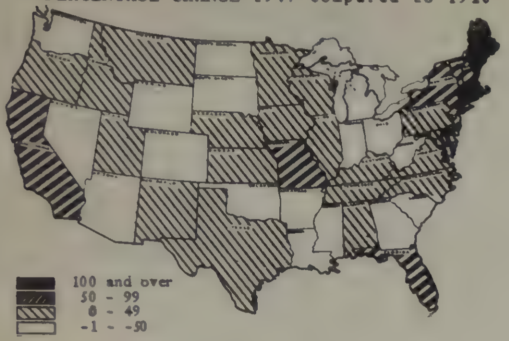
TAX LEVIES ON FARM REAL ESTATE
AMOUNT PER $100 OF VALUE, 1947



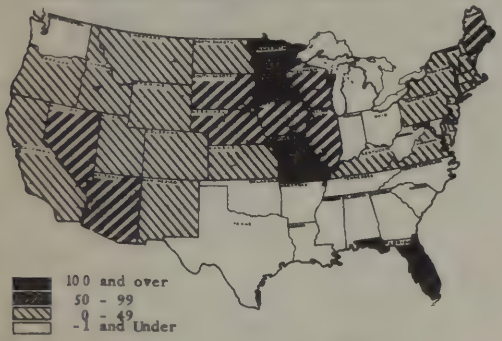
(Replaces old pages 467 and 475)

TAXES GOING UP — WILL STAY UP

TAX LEVIES ON FARM REAL ESTATE PER ACRE
PERCENTAGE CHANGE 1947 compared to 1920



TAX LEVIES ON FARM REAL ESTATE PER $100 OF VALUE
PERCENTAGE CHANGE 1947 COMPARED TO 1920



the increase in total real estate taxes per acre. In the southern states, taxes per $100 of value are lower than in 1920 because of rapidly increased land values.

Taxes on personal property have increased slightly more on a percentage basis than those in real estate. Since the 1909-1913 base period, personal property taxes have increased 269 per cent -- real estate taxes have increased only 226 per cent.

Tax increases which are now occuring reflect the need for additional revenue at local and state levels. New sources of tax revenue are no longer available as they were in 1930-35 but money is needed from somewhere to pay for public improvements. More school buildings are urgently needed in some areas. Teachers' salaries are higher than prewar. Roads, sadly neglected during the war, must now be repaired.

Real estate tax increases, such as those now occuring, are associated with rising costs. The same held true for the 1919-20 period when tax levies rose 53 per cent in two years (note the chart - p 475). Higher rates of pay for public employees, together with higher costs of materials and supplies, lead to many increases in local taxes.

The general price level will be an important factor influencing the trend in farm tax levies during the next several years. Lower income and declining sales will mean much lower revenue from sale taxes and income taxes. This may throw more of the total tax burden on farm real estate at a time when farm income is declining. It could increase the pressure for federal assistance at local levels especially in the matter of public schools. Deficit financing apparently is less painful at the more remote Washington level than it is at state, county, or village levels.

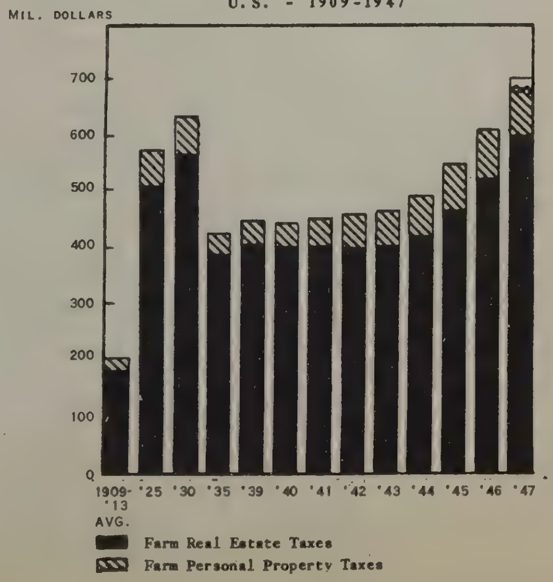
Taxes are sticky. Once they go up, they stay up (note the graph on the front of the page). Taxes are on the increase now -- it will be years before a downward trend develops. Real estate and other taxes which were not a big problem in boom times, will still have to be paid at about the same level when incomes are much lower -- then they will be a double or triple burden.

LAND VALUES

The rapid increase in real estate taxes will have a depressing effect on farm land values. Every dollar in increased taxes reduces the net earning value of a farm by $20 when figured at 5 per cent interest. When the net farm income begins to drop as it is now, farmers and prospective farm buyers become more and more conscious of high fixed costs.

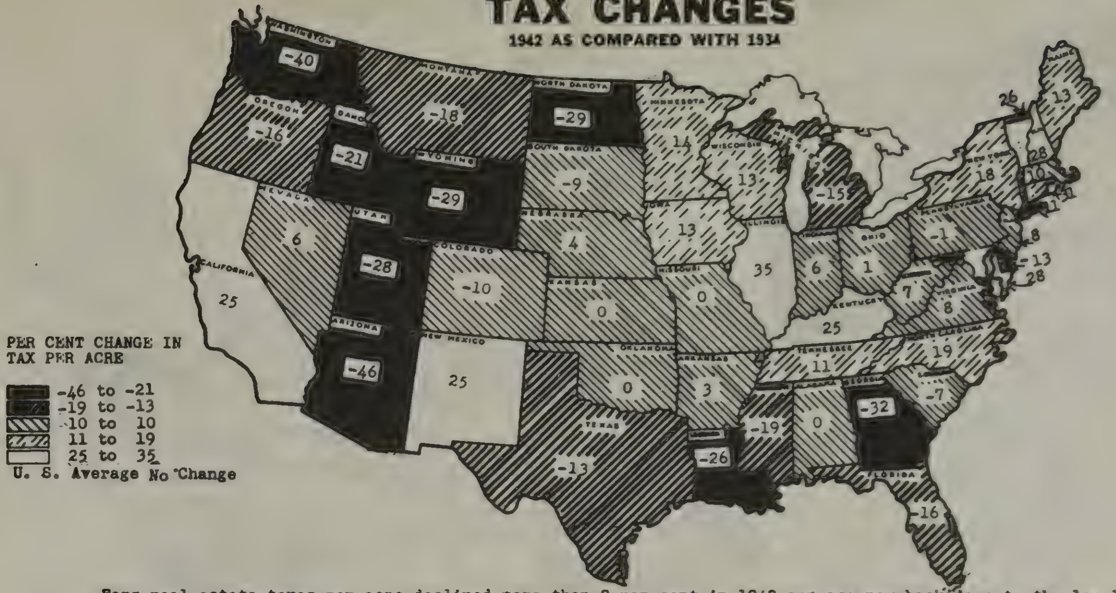
Taxes exist as a prior lien on all real estate. They must be paid before the owner has anything left for himself. Interest and payments on a first mortgage take second place to taxes. Land buyers and lenders should investigate the tax situation in the community and on every piece of property before they take final action.

TAXES LEVIED ON FARM PROPERTY
U.S. - 1909-1947



TAX CHANGES

1942 AS COMPARED WITH 1934



Farm real estate taxes per acre declined more than 2 per cent in 1942 and are now back down to the low levels of 1934 and 1935 for the nation as a whole.

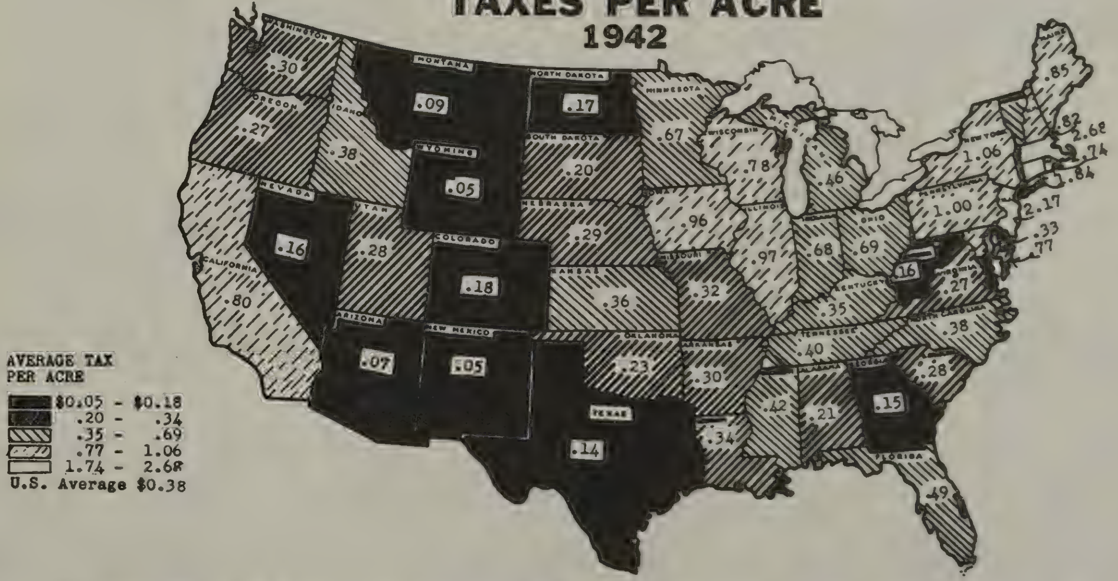
The situation by states is in striking contrast to the national average. For example taxes in Arizona are now 46 per cent below 1934 while those of Illinois are 35 per cent above. 1942 taxes as compared to 1934 are higher in 25 states, lower in 19 states and the same in 4 others.

From 1934 to 1939 the south central and south atlantic states reduced taxes considerably. Since 1939 substantial reductions occured from the wheat belt westward to the Pacific Coast.

Such tax changes are of special interest to those lending on farms or making investments in farm real estate.

TAXES PER ACRE

1942



The figure in each state shows the average tax per acre. The shading tends to differentiate the areas of similar tax per acre.

The lowest taxes per acre are naturally found in the range land and states having rough mountainous areas. There are, however, important differences between taxes per acre in areas of similar productivity and development, as is revealed by this and other maps of the Digest.

Taxes are neither high nor low in terms of dollars and cents paid per acre but are high or low in relation to factors such as the following:

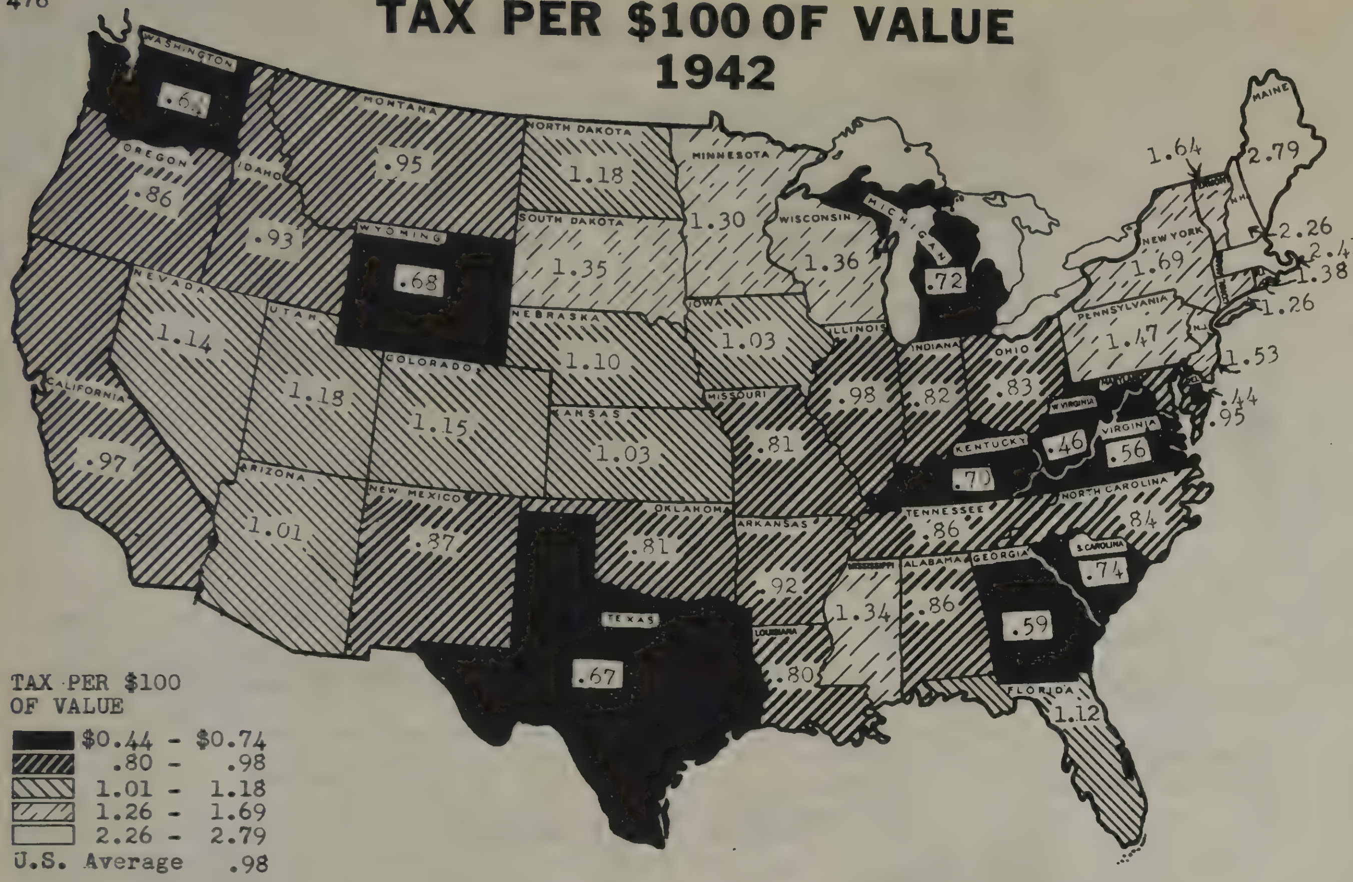
Value of land per acre;
Price of commodities sold;
Price of goods and services for which tax money is spent;
Amount, kind, and quality of services provided by taxes.

The average tax per acre in 1942 was 38 cents as compared with 19 cents in 1910 and 58 cents in the peak years of 1928 and 1929.

Preliminary estimates indicate that there will be no material change for 1943. This does not mean, however, that taxes of farmers have not increased. Sales taxes and other indirect forms of taxation are constantly increasing the tax load.

Based on Data of U.S.D.A.

TAX PER $100 OF VALUE 1942



The figure in each state shows the average tax per $100 of value. For the determination of these figures, farm real estate values are based on census estimates and the annual computations of the U. S. Department of Agriculture.

These figures show the ratio of taxes to value and reveal the extent to which farm real estate owners of the various states have a relative advantage or disadvantage as compared with farmers of other states.

The black areas, which are the states with the lowest tax per $100 of value, do not form a consistent pattern. There is little or no relationship of these areas to soil, agricultural, or other general regions.

Taxes have not increased as rapidly as land values since the war began with the result that taxes have declined to $ .98 per $100 of value. This is the lowest level since the agricultural depression of the early 1920's. Taxes per $100 of value reached an all time high of $1.54 in 1932.

Detailed data by counties shows that within practically every state there are differences in taxes as great as those shown here between states. Recent data from Nebraska indicated the range was from a low of to cents to a high of $1.92. For a similar period in Texas the range was from a low of 38 cents to a high of $2.83 per $100 valuation. Such variations stand as a condemnation of the present methods of assessing for tax purposes and the general way in which tax burdens are distributed.

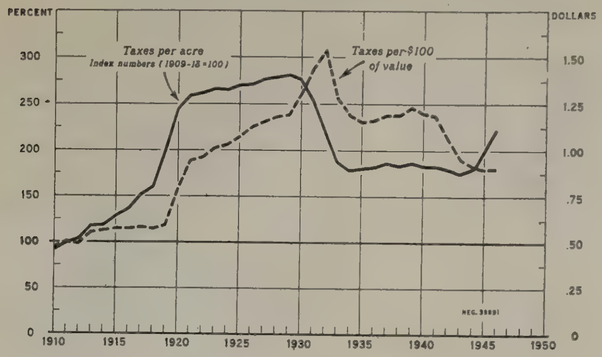
Such statistics reveal the present favored areas from the standpoint of taxes. Adjustments in taxation are usually relatively slow, so it appears a safe conclusion that present favored areas will continue to enjoy advantages for a number of years. The converse will of course be true also.

Based on Data of U.S.D.A.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

FARM TAX TRENDS

FARM REAL ESTATE TAXES PER ACRE AND PER $100 OF VALUE, UNITED STATES, 1910-46



Taxes on farm real estate during and following the first World War went proportionately higher than either prices received by farmers for their products or the value of the farms against which taxes were assessed.

Taxes per acre continued to climb until after 1929. There was no decline in taxes corresponding to the commodity price drops in 1921. Since taxes react so slowly to changing price levels, they greatly intensify the situation caused by acute price drops. Such a period occurred in 1929 and will occur again. There was a subsequent decline which leveled off after 1933 but as the graph shows, taxes remain twice as high as in 1910.

Taxes have now been increasing for five years and are likely to continue for some time. Taxes per $100 value increased rapidly from 1919 to 1932 when they were 3 times the 1909-13 average. Because property values increased more rapidly than taxes in the 1939 to 1944 period, taxes per $100 value decreased. However, since 1944, taxes have increased about as fast as property values, remaining at about 90 cents per $100 of value. This is still 80 per cent above the 1909-13 average.

There are marked differences between states in the trend of taxes. The map below shows the index level of taxes in 1946 as compared to the 1909-13 average. Many of these changes are due to the war-induced shifts in population. A good example of this can be seen in the increase of taxes in the Pacific Coast States.

The trend of real estate taxes during World War II did not follow that of World War I. Although state and local governments now have several alternate sources of revenue, this situation is believed to be only temporary. Taxes on real estate (per acre basis) have been rising since 1944 - 3 per cent in 1944, 11 per cent in 1945, and 12 per cent in 1946. It is likely that this trend will continue. Many sources of tax revenues that were exploited during the early thirties are now bearing a heavy tax load and can provide little additional relief.

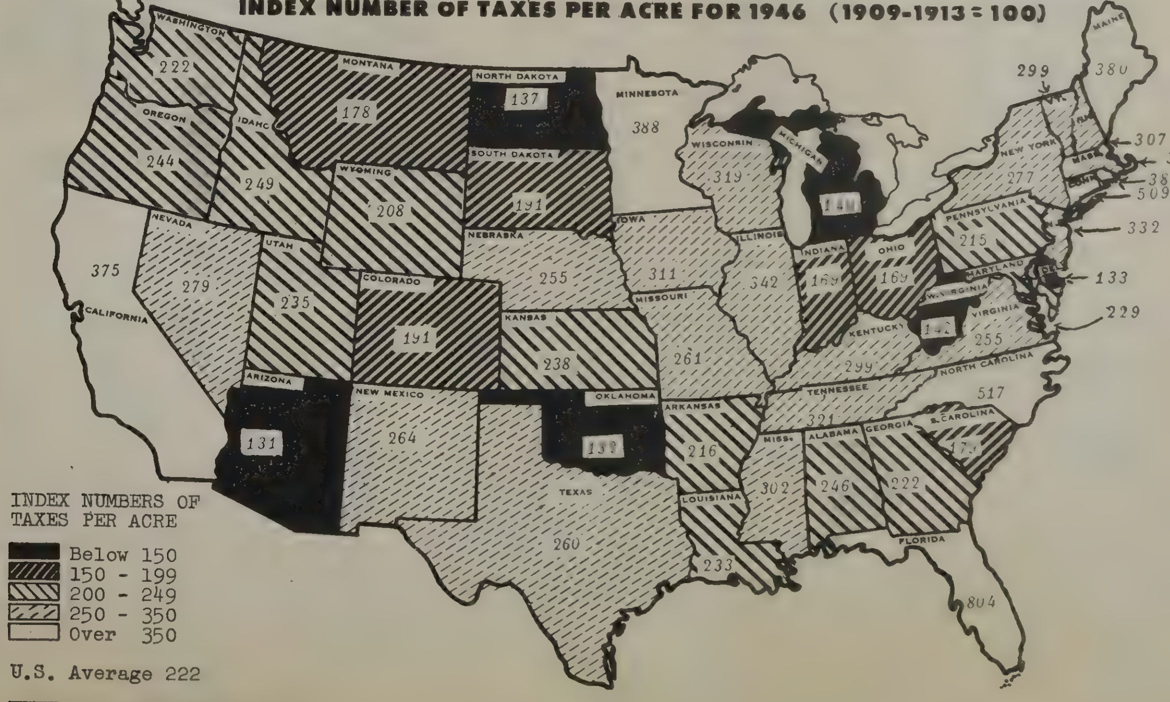
Taxes in every state have increased. Only six states have index numbers below 150. Largest percentage increases have occurred in the New England States and taxes in the Mountain States have risen the least.

Taxes are a definite land value factor. They affect the standard of living. They are frequently the controlling element in forcing destructive land use practices, as land owners often are compelled to produce income to pay taxes regardless of the effect on the land. These illustrate the many reasons why land taxes are so important.

Study the attitude of your state and local goverment toward equitable taxation. To a great extent this is an economic element subject to local governmental control, as school and county taxes are the major part of total farm real estate taxes.

PRESENT TAX LEVEL AS COMPARED TO 1909-13 AVERAGE

INDEX NUMBER OF TAXES PER ACRE FOR 1946 (1909-1913 = 100)



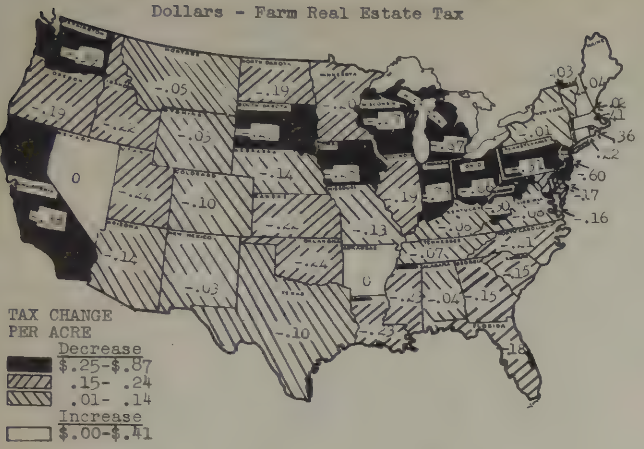
U.S. Average 222

Based on Data of U.S.D.A.

FARM TAX TRENDS

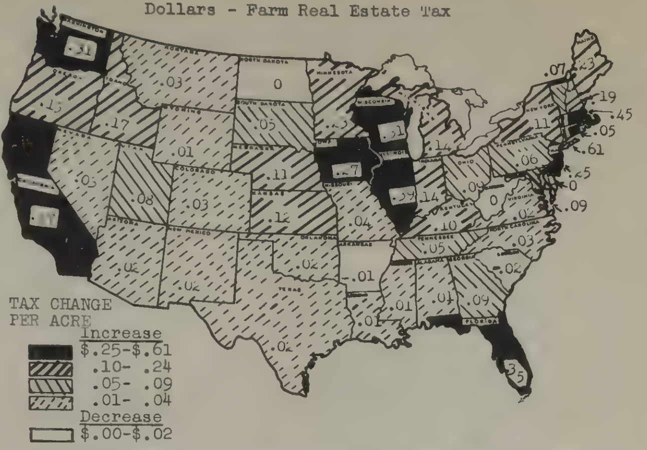
TAX CHANGE PER ACRE 1930-1943

Dollars - Farm Real Estate Tax



TAX CHANGE PER ACRE 1943-1946

Dollars - Farm Real Estate Tax



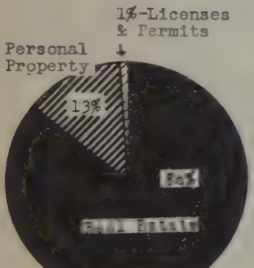
The accompanying maps show tax changes by states from 1930 to 1946. Note the graph on the front side of this page, showing that taxes continued to increase until 1929 before declining. The map-Tax Change Per Acre, from one of the highest years, 1930, shows that for 41 states taxes in 1943 were below the record high.

In 1943, this country had the lowest taxes per acre since the beginning of World War I. The map - Tax Change Per Acre 1943-46, shows that taxes for seven states increased more in the 4 year period than they declined in the thirteen year period ending 1943. From 1943 to 1946 the tax per acre for the country as a whole increased $.10 with only two states, South Carolina and Arkansas, showing declines.

Taxes are now well above the depression low, and it is expected they will rise at least a few more years. With a new social security program and demands for more government services, including big changes in the school system, increased taxes are inevitable. It seems unavoidable that real estate shall bear a larger proportion of the tax burden in the year ahead.

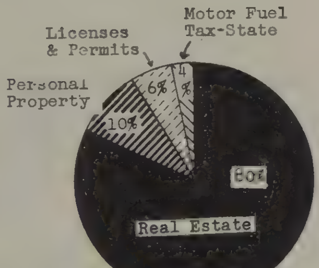
FARM-TAX DOLLAR CHANGES

1909-13



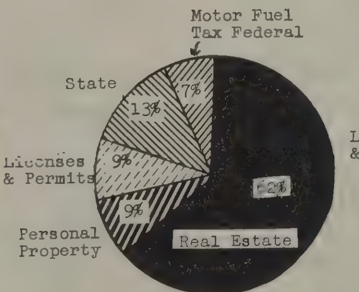
$213,947,000

1925



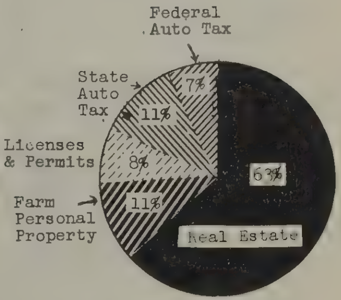
$642,435,000

1941



$646,745,000

1946



$835,621,000

Of the total farm property and automotive tax paid by farmers, a decreasing proportion is paid on real estate and a very marked increase is paid on gasoline for farm tractors, trucks, and automobiles.

The proportion derived from licenses and permits increased from less than 1 per cent in the 1909-13 base period to 10 per cent in 1941 and back to 8 per cent in 1946. The revenue from licenses and privilege taxes or permits is expected to increase. These are popular with legislators because the people on whom the burden falls do not constitute a large voting bloc.

In 1946 farmers paid 146 million dollars in motor fuel taxes as contrasted to 127 million in 1941 and only 22 million in 1925. State taxing of motor fuel began in 1919 and Federal taxing in 1932. Since then, the Federal portion has increased more rapidly than the states' and in 1946, 60 per cent went to state and 40 per cent went to the Federal government.

Based on Data of U.S.D.A.

Taxes on land are fixed charges over which the owners and operators have little control. Gasoline and automobile license taxes are related directly to operation and are thus costs assumed in the increased use of power equipment. They rise in periods of high prices because of the increase in tractor and truck use and will decrease with a lull in farm operations. Unlike farm land taxes they move simultaneously with income, and therefore are based on ability to pay. This is, of course, a well recognized and constructive principle of taxation.

As increased taxes accrue from such sources, it is a matter of definite concern that corresponding tax decreases fall on farm real estate where relief is so definitely needed. The prospects for such a decrease are diminishing and, as farmers demand and receive more government services and help, they can expect to pay higher taxes on farm real estate.

HOW TO REPORT 1953 FARM INCOME TAXES

If your gross income during 1952 was $600 or more you must file a return whether you owe a tax or not. Gross income is total income before expenses are deducted.

Date Return Is Due: File return and pay tax on or before January 31, 1954; or file an estimate of tax and pay this amount by January 15, 1954 and then file final return and pay any balance by March 15, 1954.

If business year does not start January 1, file return and pay tax within 31 days after end of business year; or file an estimate within 15 days and a return within 2½ months.

Forms Needed By Farmers

Form 1040F -- Used to summarize farm income and expenses and to figure net profit or loss from farming.

Schedule D (Form 1040) -- Used to show gains and losses from sales of property used in the business, such as dairy cows and farm equipment.

Form 1040 -- Used to report net income. Farm profits are transferred from 1040F -- enter other items of income or expense and deductions.

Form 1040ES -- Used to declare an estimate of tax. Do not use this form if you file return and pay tax by January 31.

Forms 1099 and 1096 -- Used to report payment of $600 or more in wages to hired worker. Send one copy to the employee, the other to Bureau of Internal Revenue by February 28, 1954.

Form 1065 -- Used to file partnership reports. No tax is paid by partnership but it must be reported.

Form 843 -- Used when claiming a refund.

Form 1045 -- Used when claiming a refund of last year's taxes due to a farm operating loss this year.

SALE OF A FARM

Sale of a farm is reported in the same way as the sale of other capital assets. Here's how gains and losses are computed.

1. Add the cost of all improvements that were made during the period of ownership to the original price paid for the farm. (However, if the farm was acquired prior to March 1, 1913 or it was not acquired by purchase, special rules may apply. These are covered in the instructions on the back of Schedule D.)

2. Subtract from this sum the total of all depreciation during the period of ownership.

3. From the selling price of the farm and unharvested crops, subtract the sum of (1) the amount computed in step 2, and (2) the cash cost of producing the unharvested crop.

4. Subtract from the amount computed in step 3 the cost of selling the farm (commission, abstracting, recording fees, etc.). The remainder will be the gain or loss -- which is to be reported in Schedule D, and filed with Form 1040.

If the seller had owned the farm for only 6 months or less, all the gain from its sale must be reported as ordinary income.

REPAIRS AND IMPROVEMENTS

Normally repairs are defined as work done to maintain an item in its present condition and to prevent further deterioration. The cost of repairs can be deducted fully in the year they are made.

If the life of a building or machine is lengthened or the value increased then it is an improvement instead of a repair. The cost is classified as a capital investment. This cost must be recovered by depreciation throughout the years of its useful life. These costs should not be deducted as current operating expenses.

Two methods of depreciating the costs of improvements can be used.

- A new cost of the building or equipment may be determined by adding the unrecovered cost of the item and the cash paid out for materials, parts, and labor for the improvement. Then a new life expectancy is determined. Annual depreciation allowance is then figured by dividing the new value of the building by the adjusted life expectancy.

- A second method is to list the improvements separately on the depreciation schedule and leave the values and life expectancies of the old building just as they are. When this method of handling improvements is used, the taxpayer establishes a life expectancy and computes the depreciation for each improvement as a separate item. This plan is much simpler and is used by a great many farmers.

Sometimes it's hard to decide how to report tractor or machinery repair. Should it be called a repair and treated as an annual operating expense, or considered an improvement and depreciated? This will depend mostly on the size of a farmer's operation.

For the large farmer who has several tractors and considerable work of this type each year, it can be treated as repairs. The small farmer with only one tractor would usually consider major overhaul work as a capital expense and depreciate it over a period of years.

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QUESTIONS AND ANSWERS ON FEDERAL INCOME TAX

What are the important recent changes?

Only one important change affecting farmers has been made this year. This change was the fast tax write-off allowed on new grain storage construction. See page 480.1 for further discussion of this change.

How do partnerships report?

A partnership does not pay any income tax. The partnership must file an information return on Form 1065. Form 1040F may be used to show the farm income and expenses. Each individual partner then includes his share of the partnership income in Form 1040.

The ordinary landlord-tenant relationship is not a partnership. Therefore, each party should file his tax return as an individual.

What can you do if your return is questioned?

If your return is questioned and, at a conference with a local representative of the Internal Revenue Service payment of additional tax is required you may:

- Ask for an informal conference for the purpose of discussing the proposed adjustments with a conferee or --
- If it is clear to you that you owe the amount requested, sign a waiver and pay the additional tax.

If you are not satisfied with the explanation furnished by the conferee, you should not sign a waiver and you will receive a 30-day letter. The receipt of a 30-day letter gives you 30 days from the date of the letter in which to decide whether the additional tax is owed and to choose one of three courses of action.

First, you may file a formal protest under oath with the district director and request that the case be transferred to the Appellate Division of the District. Second, you can, by request or by simply failing to respond during the 30-day period, secure the issuance of the statutory notice from which an appeal may be taken to the Tax Court of the United States. Third, you may sign the enclosed waiver.

Is the loss or damage to a growing crop deductible?

No, but any insurance received as a result of loss or damage (such as hail insurance) should be reported as other farm income.

What farm business outlays are not deductible as cash expenses?

Capital investments and repayment of debt principal are not deductible as current operating expenses. Capital investments include new equipment, new buildings, major improvements to old buildings, new fencing and major overhaul of machinery.

Who can be claimed as a dependent?

There is no age qualification for a dependent. Anyone qualifying as a dependent must receive more than half of his support from the taxpayer, must have a gross income of less than $600, and must bear a given relationship to the taxpayer. Thus, a father may not claim as a dependent a son who receives a gross income of $600, though he may if the income of the son is $599. If you share the responsibility of supporting a dependent with someone else, be sure that one of you is furnishing over one-half of the dependent's support.

Can wages paid to your child be deducted?

Reasonable cash wages paid to a minor child for work actually performed as a bona fide employee may be deducted as a business expense.

If the father takes the child's earnings and utilizes them for his own purposes, or if the father requires the child to purchase his own clothing or other necessities, the deduction of the child's earnings as a business expense will be disallowed to that extent.

How should hired farm workers file income tax returns?

A hired farm worker who expects to earn $600 or more during any calendar year should file a declaration of estimated tax (Form 1040ES) by March 15 of the current year.

The hired worker includes in his income, at a fair market value, the board and lodging that he received. But if he must live on his employer's premises in order to fulfill his duties properly, he does not have to add their value to his other income.

Can you correct an error in a return that has been filed?

Yes, by filing an amended return for the year in question. The amended return should be made on the forms for the year of the incorrect return, should be labeled "amended", and must be filed within 3 years after the due date of the incorrect return.

Should the value of farm products consumed in the household be reported as income?

No. Nor is the cost of producing them a deductible expense.

Can the cost of buying and hauling water for livestock be deducted as an operating expense?

Yes, but no charge can be made for labor if you haul it yourself.

*****

Above material selected from Special Circular 12, University of Wisconsin, and Ext. Bulletin 902, Cornell University.

NO MORAL, FINANCIAL, OR LEGAL RESPONSIBILITY IS ASSUMED BY THE DIGEST EDITORS FOR ACTIONS BASED ON THEIR INTERPRETATIONS OR SUGGESTIONS. SUCH RESPONSIBILITY MUST REST WITH THE INDIVIDUAL TAXPAYER.

HOW TO REPORT 1948 FARM INCOME TAXES

Every citizen or resident of the United States who had a gross income of $600 or more in 1948 is required by law to file a Federal income-tax return, even though no tax is due.

Date Return Is Due

If at least two-thirds of your gross income is from farming and your business year starts January 1, you have two choices. Either:

1. File your return and pay the tax on or before January 15, 1949; or
2. File an estimate of your tax and pay this amount by January 15, 1949 and then file your return and pay any balance due by March 15, 1949.

If your business year does not start January 1, you may file your return and pay the tax within 15 days after the end of your business year; or you may file an estimate within 15 days and a return within 2½ months after the end of your business year.

Forms Needed by Farmers

Obtain from the Collector of Internal Revenue; or from your local Federal income-tax office, bank, or post office, two copies of each of the following forms. (One copy you file with the Collector of Internal Revenue and the other you should keep for future reference.)

Form 1040F

You use form 1040F to summarize your farm receipts and expenses and to calculate your net farm profit.

Schedule D (form 1040)

You need Schedule D (form 1040) if you had gains or losses from sales of property considered as sales of capital assets; such as sales of equipment, or sales of dairy cows which reduced the size of your herd or made room for replacements of a different quality or breed.

Form 1040 (including one copy of instructions for this form)

You transfer your net farm profit to form 1040 from form 1040F and use form 1040 to record other items of income and deductions and to calculate the tax.

Form 1040ES

You use form 1040ES to file an estimate of your tax. You do not need this form if you file your return within 15 days after the end of your business year (January 15 if your year ends December 31).

Forms 1096 and 1099

You use forms 1096 and 1099 to report wages paid by you. If you paid any worker $600 or more during the year, you need 2 copies of form 1096 and also enough copies of form 1099 to give one to each worker paid $600 or more and to keep duplicate copies for your own reference.

Reporting Certain Sales of Livestock

Taxpayers are allowed, under certain circumstances specified below, to consider the sale of dairy, breeding, or work stock as a sale of a capital asset. This usually means that only 50 per cent of the gain from such sales is taxable.

For the 1948 tax year, if the sale of dairy, breeding, or work stock is to be considered as the sale of a capital asset, the following requirements must be met:

1. The animals must have been held for more than 6 months and must have been in use for dairy, breeding, or work purposes at the time of sale.
2. The sale must have; (a) reduced the normal size of the herd; or (b) made room for replacements to change the quality or breed of the herd.

Example of reducing size of herd

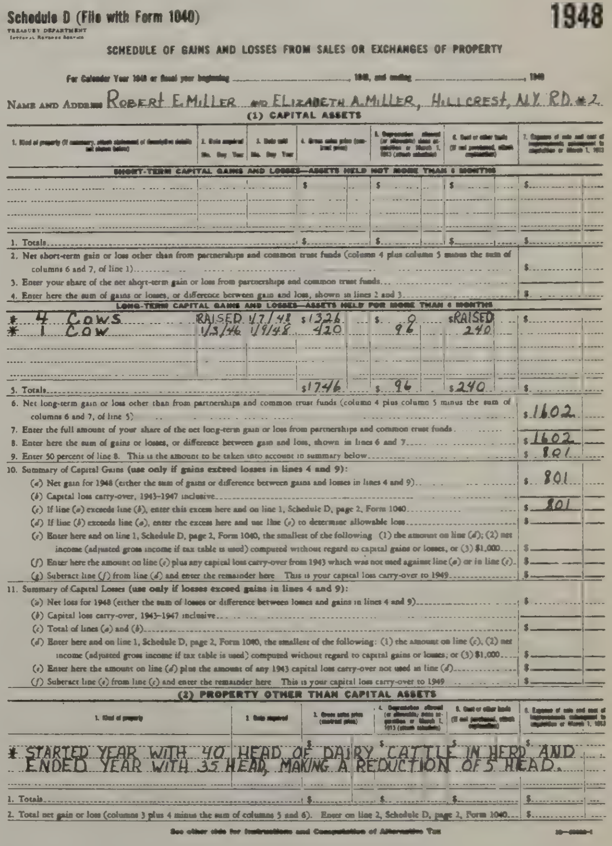
A farmer had 40 head of cows, heifers, and bulls in his dairy herd at the beginning of the year. During the year he sold 8 cows, bought some cows, and raised some heifers. But he ended the year with 35 head. He had thus reduced his herd by 5 head and could, therefore, report the sale of the 5 cows that brought the highest prices as the sale of a capital asset. The sale of these 5 cows would be reported on Schedule D (form 1040) and would not be shown on the farm blank form 1040F where the sale of the other 3 cows would be reported.

Example of change in quality or breed of herd

A farmer with a herd of 40 cows with an average production of 7000 pounds of milk per cow has been maintaining this production by selling about 10 cows a year and replacing them with about 4 purchased and 6 raised. None of the 10 cows sold could be considered as the sale of a capital asset because the farmer had not reduced the size of his herd nor changed the quality or breed.

But suppose that in 1948 this farmer deviated from his normal practice and made exceptional sales totaling 30 cows, kept his 10 best ones, and bought 30 others, maintaining the 40-cow herd, which increased his average herd production to 9000 pounds of milk per cow. Then the sale of the 30 cows could be considered as a sale of a capital asset because they were sold to make room for replacements which changed the quality of the herd.

The examples given merely show types of sales that would and would not be properly considered as sales of capital assets for tax purposes. The important point in treating sales of this type as sales of capital assets is that the farmer be prepared to demonstrate that he departed from his normal practice and that the transaction actually changed the quality of the herd, such as substantially increasing production per cow. Since every case must rest upon the facts peculiar to it, examples can only illustrate the factors usually found in such cases.



Schedule D (File with Form 1040) **1948**

TREASURY DEPARTMENT
Internal Revenue Service

SCHEDULE OF GAINS AND LOSSES FROM SALES OR EXCHANGES OF PROPERTY

For Calendar Year 1948 or fiscal year beginning ...., 1948, and ending ...., 1949

NAME AND ADDRESS Robert E. Miller and Elizabeth A. Miller, Hillcrest, N.Y. RD. #2.

(1) CAPITAL ASSETS

SHORT-TERM CAPITAL GAINS AND LOSSES—ASSETS HELD NOT MORE THAN 6 MONTHS

1. Totals .... $ .... $ .... $ .... $ ....
2. Net short-term gain or loss other than from partnerships and common trust funds (column 4 plus column 5 minus the sum of columns 6 and 7, of line 1) .... $
3. Enter your share of the net short-term gain or loss from partnerships and common trust funds ....
4. Enter here the sum of gains or losses, or difference between gain and loss, shown in lines 2 and 3 .... $

LONG-TERM CAPITAL GAINS AND LOSSES—ASSETS HELD FOR MORE THAN 6 MONTHS

* 4 Cows	RAISED	1/7/48	$1326	$ 0	$RAISED	$
* 1 Cow	1/3/46	1/9/48	420	96	240	
5. Totals			$1746	$ 96	$240	$

6. Net long-term gain or loss other than from partnerships and common trust funds (column 4 plus column 5 minus the sum of columns 6 and 7, of line 5) $1602
7. Enter the full amount of your share of the net long-term gain or loss from partnerships and common trust funds ....
8. Enter here the sum of gains or losses, or difference between gain and loss, shown in lines 6 and 7 .... $1602
9. Enter 50 percent of line 8. This is the amount to be taken into account in summary below .... $ 801
10. Summary of Capital Gains (use only if gains exceed losses in lines 4 and 9):
    (a) Net gain for 1948 (either the sum of gains or difference between gains and losses in lines 4 and 9) .... $ 801
    (b) Capital loss carry-over, 1943–1947 inclusive ....
    (c) If line (a) exceeds line (b), enter this excess here and on line 1, Schedule D, page 2, Form 1040 .... $ 801
    (d) If line (b) exceeds line (a), enter the excess here and use line (e) to determine allowable loss .... $
    (e) Enter here and on line 1, Schedule D, page 2, Form 1040, the smallest of the following (1) the amount on line (d); (2) net income (adjusted gross income if tax table is used) computed without regard to capital gains or losses, or (3) $1,000 .... $
    (f) Enter here the amount on line (e) plus any capital loss carry-over from 1943 which was not used against line (a) or in line (e) .... $
    (g) Subtract line (f) from line (d) and enter the remainder here. This is your capital loss carry-over to 1949 .... $
11. Summary of Capital Losses (use only if losses exceed gains in lines 4 and 9):
    (a) Net loss for 1948 (either the sum of losses or difference between losses and gains in lines 4 and 9) .... $
    (b) Capital loss carry-over, 1943–1947 inclusive ....
    (c) Total of lines (a) and (b) .... $
    (d) Enter here and on line 1, Schedule D, page 2, Form 1040, the smallest of the following: (1) the amount on line (c), (2) net income (adjusted gross income if tax table is used) computed without regard to capital gains or losses; or (3) $1,000 .... $
    (e) Enter here the amount on line (d) plus the amount of any 1943 capital loss carry-over not used in line (d) .... $
    (f) Subtract line (e) from line (c) and enter the remainder here. This is your capital loss carry-over to 1949 .... $

(2) PROPERTY OTHER THAN CAPITAL ASSETS

* STARTED YEAR WITH 40 HEAD OF DAIRY CATTLE IN HERD AND ENDED YEAR WITH 35 HEAD, MAKING A REDUCTION OF 5 HEAD.

1. Totals .... $ .... $ .... $ .... $
2. Total net gain or loss (columns 3 plus 4 minus the sum of columns 5 and 6). Enter on line 2, Schedule D, page 2, Form 1040 .... $

See other side for Instructions and Computation of Alternative Tax

If a taxpayer claims that a sale of livestock is the sale of a capital asset, he should include an explanatory statement in his return to support his claim. For example, the farmer in the first illustration given should put the following statement on Schedule D (form 1040) "Started year with 40 head of dairy cattle in herd and ended year with 35 head, making a reduction of 5 head."

The farmer in the second illustration, where the sale improved the quality of the herd, should include a statement giving a full explanation of what his normal practice of maintaining his herd had been and showing that in 1948 he had made **exceptional sales and purchases that definitely improved the quality of his herd.**

DOANE AGRICULTURAL SERVICE, Inc., St. Louis 8, Mo.

QUESTIONS AND ANSWERS ON FEDERAL INCOME TAX

What is the major difference between reporting on the cash and on the accrual basis?

On a **cash** basis, gross income includes all cash received during the taxable year from sales of farm products whether produced that or an earlier year, but does not include products sold on credit or changes in the inventory value of livestock and farm produce on the farm. The allowable business expenses include all expenses paid in **cash** during the year, for that year or any other year, but do not include expenses incurred and **not paid.**

On an **accrual** basis, gross income includes all income received or earned during the taxable year, from **that year's business only.** It includes cash sales, increases in the inventory value of livestock, supplies, and produce, plus any other income earned but not received. The allowable business expenses include all expenses for **that year's business only,** regardless of whether these expenses were paid, or incurred and unpaid.

If a return is made on a cash basis, pages 1 and 3 of form 1040F are filled in; if the report is made on an accrual basis, pages 2 and 3 are filled in.

Why may a wide variation in income from year to year result in the payment of a greater aggregate of taxes than if the same income were distributed more evenly from year to year?

Because the income of each year is taxed separately. If net income of one year does not equal allowable deductions for personal exemptions and credit for dependents, the balance cannot be carried forward and used to reduce a taxable balance in later years. Also, in years of large income, the taxpayer may be subject to a surtax in one of the higher brackets.

Which method of reporting should a farmer use?

If a farmer has a relatively constant cash income from year to year, he will probably find the cash basis the more satisfactory.

Growers of fruit, cabbage, potatoes, or other crops that may be stored and sold in the next tax year may find it desirable to report on the accrual basis, to prevent the possibility of having to pay a tax on two years' crops in one year. This may apply also to growers of nursery stock and to livestock raisers who may sell the production of more than one year during one tax-reporting period.

Making the Return

Farm income for tax purposes on the cash basis is the sum of four groups of items:

1. Cash from sales of livestock **raised** during the taxable year or in **prior years** and not treated as sales of capital assets.
2. Cash from sales of livestock products, crops, and other farm products raised or produced and sold.
3. Cash receipts from "other farm income" such as breeding fees and work done off the farm.
4. The profits from the cash sales of any livestock or other items that were purchased, aside from cash sales treated as sales of capital assets.

The gross income on the accrual basis includes all income received or earned during the taxable year **from that year's business only.** This income includes sales of farm products, for either cash or credit; income earned but not received; and increases in the inventory value of livestock, supplies, and other farm products.

The allowable business expenses include all expenses incurred during the taxable year **for that year's business only,** regardless of whether these expenses were paid in cash or incurred and unpaid.

What farm expenses are allowable (page 3, form 1040F) as deductions in arriving at the net farm profit?

In general, all expenses necessary to the operation of the farm as a business enterprise are allowable as deductions in arriving at the net farm profit. These expenses, which are entered on the upper half of page 3 of form 1040F, and are discussed on page 4 of that form, include such items as hired labor, feed, fertilizer, seed, gas and oil used in the farm business, taxes and insurance paid on farm property (but not on farmer's dwelling), interest paid on mortgages and notes arising out of the farm business, cash rent paid, and milk hauling. **(See Digest Page 485)**

Taxes

On the farm house, State taxes on gasoline used for personal driving, share of automobile license allocated to personal use of car, and the state personal-income and state unincorporated business taxes are deductible.

Special assessments for improvements, such as drainage, paving, and the like, are not deductible.

Can depreciation on orchards and vineyards be deducted?

Depreciation on commercial orchards and vineyards (investment in trees or vines aside from the value of bare land) is allowed if on a reasonable basis. But if an orchard or vineyard has been grown by the present owner and the costs deducted on previous income-tax returns as **annual operating expenses,** then depreciation **cannot** be justified because the costs have already been charged off once.

There are no nation-wide or even state-wide "official" rates for calculating orchard or vineyard depreciation. The taxpayer should use his best judgment in estimating the probable length of the productive life of his orchard or vineyard.

How should costs of developing new orchards and improving land be treated?

Amounts spent in developing orchards and farms must in general be treated as capital investments. Some typical items the cost of which must be treated as capital investments are: clearing brush, trees, and stumps; leveling and conditioning land; the cost of trees and the planting of young orchards; installing tile drains, ditches, and irrigation systems; straightening creek beds; and constructing reservoirs, dams, and roads. The taxpayer may, however, treat as **either** capital investments or current expenses such expenditures during the development period of orchards, as cultivating and spraying of trees, taxes, and water for irrigation.

If a cow dies during the year, may the amount of this loss be deducted?

A farmer reporting on the cash basis may not deduct such a loss if he raised the cow. If he purchased the cow, he may deduct the price paid, less depreciation and any insurance received. If the cow died from old age or sickness, the loss should be entered in the depreciation schedule on page 3 of form 1040F, accompanied by suitable explanation. If the cow was killed by a destructive force, such as lightning or an automobile, or by order of governmental authorities because of disease, the loss should be reported on Schedule D (form 1040).

A farmer reporting on the accrual basis would not deduct the loss in the depreciation schedule, for such a loss would be offset by a reduction in the inventory at the close of the year.

How is the interest on "E" and "F" United States Savings Bonds treated (item 4 of form 1040)?

A taxpayer on the cash basis may elect to include the accrued interest annually in his return, or to include the total in the year the bond is cashed or redeemed. But if he starts reporting the accrued interest annually, he cannot shift to the other method without permission from the Commissioner of Internal Revenue; he can, however, shift the other way at will. A taxpayer on the accrual basis must include the accrued interest annually in his return.

What recourse does one have if his Federal income-tax return for a previous year is questioned by the Bureau of Internal Revenue and payment of an additional tax is requested?

If the return is questioned and, at a conference with a representative of the Bureau of Internal Revenue, payment of additional tax is required, the taxpayer may (1) ask for a so-called "30-day letter" explaining the basis for the additional tax; or (2) if it is clear to him that he owes the amount requested, he may sign a waiver and pay the additional tax.

If the taxpayer is not satisfied with the explanation contained in the "30-day" letter, he should not sign a waiver but should request a hearing before a representative of the Collector's Office or of the Internal Revenue Agent in Charge, whichever office sent the letter. The receipt of a 30-day letter gives the taxpayer 30 days from the date of the letter in which to decide whether the additional tax is owed or whether he wishes to request a hearing.

How should the sale of a farm be reported?

The method of calculating and reporting the gain or loss from the sale of real estate is highly complicated. . . . . It is, therefore, suggested that any person who sells a farm should get the assistance of an Internal Revenue official or an accountant or lawyer skilled in income-tax matters, in making his income-tax return.

Material on these two pages was selected from Cornell Extension Bulletin 756. No moral, financial, or legal responsibility is assumed by the authors or the Digest editors for actions based on their interpretations or suggestions. Such responsibility must rest with the individual taxpayer.

HOW TO REPORT 1949 FARM INCOME TAXES

Every citizen or resident of the United States who had a gross income of $600 or more in 1949 is required by law to file a Federal income-tax return, whether or not a tax payment is due.

Date Return Is Due

If at least two-thirds of your gross income is from farming and your business year starts January 1, you have two choices. Either:

1. File your return and pay the tax on or before January 31, 1950; or
2. File an estimate of your tax and pay this amount by January 15, 1950 and then file your return and pay any balance due by March 15, 1950.

If your business year does not start January 1, you may file your return and pay the tax within 31 days after the end of your business year; or you may file an estimate within 15 days and a return within 2½ months after the end of your business year

Federal Forms Needed by Farmers

Obtain from the Collector of Internal Revenue; or from your local Federal income-tax office, bank, or post office, two copies of each of the following forms. (One copy you file with the Collector of Internal Revenue and the other you should keep for future reference.)

Form 1040F

You use form 1040F to summarize your farm receipts and expenses and to calculate your net farm profit.

Schedule D

You need Schedule D if you had gains or losses from sales of property considered as sales of capital assets; such as sales of equipment, or sales of dairy cows which reduced the size of your herd or made room for replacements of a different quality or breed.

Form 1040 (including one copy of the pamphlet, **How to Prepare Your U.S. Income-Tax Return)**

You transfer your net farm profit to form 1040 from form 1040F and use form 1040 to record other items of income and deductions and to calculate the tax.

Form 1040ES

You use form 1040ES to file an estimate of your tax. You do not need this form if you file your return within 31 days after the end of your business year (January 31 if your year ends December 31).

Forms 1096 and 1099

You use forms 1096 and 1099 to report wages paid by you. If you paid any worker $600 or more during the year, you need 2 copies of form 1096 and also enough copies of form 1099 to give one to each worker paid $600 or more and to keep duplicate copies for your own reference.

Reporting Certain Sales of Livestock

Taxpayers are allowed, under certain circumstances, to consider the sale of dairy, breeding, or work stock as a sale of a capital asset. This means that only 50 per cent of the gain from such sales is taxable.

The procedure for handling income, for Federal income-tax purposes, from the sale of dairy, breeding, and work stock, at the time this publication goes to press is outlined below in accordance with present regulations which are exactly the same as last year. Decisions on certain cases now pending in Federal Courts may eventually affect the way in which the sales of livestock should be handled.

Based on present rules and regulations, if the sale of dairy, breeding, or work stock is to be considered as the sale of a capital asset, the following requirements must be met:

1. The animals must have been held for more than 6 months and must have been in use for dairy, breeding, or work purposes at the time of sale.
2. The sale must have; (a) reduced the normal size of the herd; or (b) made room for replacements to change the quality or breed of the herd.

Example of reducing size of herd

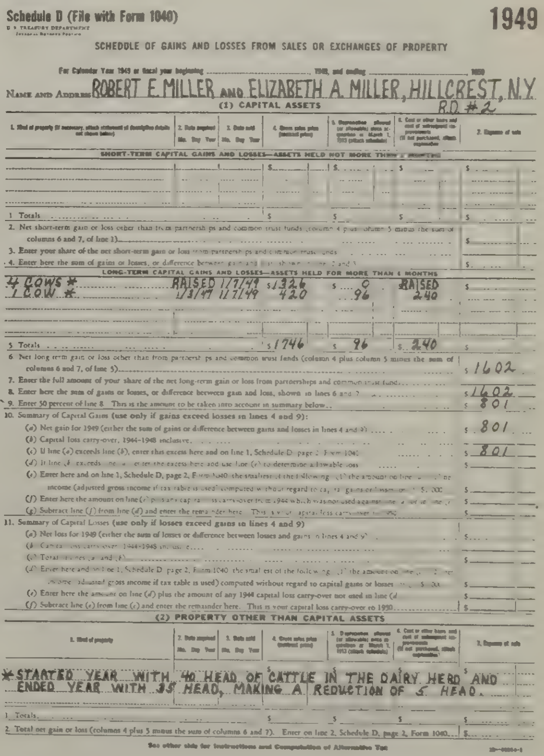
A farmer had 40 head of cows, bred heifers, and herd bulls in his dairy herd at the beginning of the year. During the year he sold 8 cows, bought some cows, and raised some heifers. But he ended the year with 35 head of cows, bred heifers, and herd bulls. He had thus reduced his dairy herd by 5 head and could, therefore, report the sale of the 5 cows that brought the highest prices as the sale of a capital asset. The sale of these 5 cows would be reported on Schedule D and would not be shown on the farm blank form 1040F where the sale of the other 3 cows would be reported.

Example of change in quality or breed of herd

A farmer with a herd of 40 cows with an average production of 7000 pounds of milk per cow has been maintaining this production by selling about 10 cows a year and replacing them with about 4 purchased and 6 raised. None of the 10 cows sold could be considered as the sale of a capital asset because the farmer had not reduced the size of his herd nor changed the quality or breed.

But suppose that in 1949 this farmer deviated from his normal practice and made exceptional sales totaling 30 cows, kept his 10 best ones, and bought 30 others, maintaining the 40-cow herd, which increased his average herd production to 9000 pounds of milk per cow. Then the sale of the 30 cows could be considered as a sale of a capital asset because they were sold to make room for replacements which changed the quality of the herd.

The examples given merely show types of sales that would and would not be properly considered as sales of capital assets for tax purposes. The important point in treating sales of this type as sales of capital assets is that the farmer be prepared to demonstrate that he departed from his normal practice and that the transaction actually changed the quality of the herd, such as substantially increasing production per cow. Since every case must rest upon the facts peculiar to it, examples can only illustrate the factors usually found in such cases.



Schedule D (File with Form 1040) **1949**

U. S. TREASURY DEPARTMENT
Internal Revenue Service

SCHEDULE OF GAINS AND LOSSES FROM SALES OR EXCHANGES OF PROPERTY

For Calendar Year 1949 or fiscal year beginning ...., 1949, and ending ...., 1950

NAME AND ADDRESS ROBERT E. MILLER AND ELIZABETH A. MILLER, HILLCREST, N.Y. R.D. #2

(1) CAPITAL ASSETS

1. Kind of property (if necessary, attach statement of descriptive details not shown below)	2. Date acquired Mo. Day Year	3. Date sold Mo. Day Year	4. Gross sales price (contract price)	5. Depreciation allowed (or allowable) since acquisition or March 1, 1913 (attach schedule)	6. Cost or other basis and cost of subsequent improvements (If not purchased, attach explanation)	7. Expense of sale
SHORT-TERM CAPITAL GAINS AND LOSSES—ASSETS HELD NOT MORE THAN 6 MONTHS						
			$	$	$	$
1 Totals			$	$	$	$

2. Net short-term gain or loss other than from partnerships and common trust funds (column 4 plus column 5 minus the sum of columns 6 and 7, of line 1) $
3. Enter your share of the net short-term gain or loss from partnerships and common trust funds
4. Enter here the sum of gains or losses, or difference between gain and loss, shown in lines 2 and 3 $

1. Kind of property	2. Date acquired	3. Date sold	4. Gross sales price	5. Depreciation allowed	6. Cost or other basis	7. Expense of sale
LONG-TERM CAPITAL GAINS AND LOSSES—ASSETS HELD FOR MORE THAN 6 MONTHS						
4 COWS *	RAISED	1/7/49	$1326	$ 0	RAISED	$
1 COW *	1/3/47	1/7/49	420	96	240	
5 Totals			$1746	$ 96	$ 240	$

6. Net long-term gain or loss other than from partnerships and common trust funds (column 4 plus column 5 minus the sum of columns 6 and 7, of line 5) $1602
7. Enter the full amount of your share of the net long-term gain or loss from partnerships and common trust funds
8. Enter here the sum of gains or losses, or difference between gain and loss, shown in lines 6 and 7 $1602
9. Enter 50 percent of line 8. This is the amount to be taken into account in summary below $801
10. Summary of Capital Gains (use only if gains exceed losses in lines 4 and 9):
    (a) Net gain for 1949 (either the sum of gains or difference between gains and losses in lines 4 and 9) $801
    (b) Capital loss carry-over, 1944-1948 inclusive
    (c) If line (a) exceeds line (b), enter this excess here and on line 1, Schedule D, page 2, Form 1040 $801
    (d) If line (b) exceeds line (a), enter the excess here and use line (e) to determine allowable loss $
    (e) Enter here and on line 1, Schedule D, page 2, Form 1040, the smallest of the following: (1) the amount on line (d); (2) net income (adjusted gross income if tax table is used) computed without regard to capital gains or losses; or (3) $1,000 $
    (f) Enter here the amount on line (e) plus any capital loss carry-over from 1944 which was not used against line (a) $
    (g) Subtract line (f) from line (d) and enter the remainder here. This is your capital loss carry-over to 1950 $
11. Summary of Capital Losses (use only if losses exceed gains in lines 4 and 9)
    (a) Net loss for 1949 (either the sum of losses or difference between losses and gains in lines 4 and 9) $
    (b) Capital loss carry-over, 1944-1948 inclusive
    (c) Total of lines (a) and (b) $
    (d) Enter here and on line 1, Schedule D, page 2, Form 1040, the smallest of the following: (1) the amount on line (c); (2) net income (adjusted gross income if tax table is used) computed without regard to capital gains or losses; or (3) $1,000 $
    (e) Enter here the amount on line (d) plus the amount of any 1944 capital loss carry-over not used in line (d) $
    (f) Subtract line (e) from line (c) and enter the remainder here. This is your capital loss carry-over to 1950 $

(2) PROPERTY OTHER THAN CAPITAL ASSETS

1. Kind of property	2. Date acquired Mo. Day Year	3. Date sold Mo. Day Year	4. Gross sales price (contract price)	5. Depreciation allowed (or allowable) since acquisition or March 1, 1913 (attach schedule)	6. Cost or other basis and cost of subsequent improvements (If not purchased, attach explanation)	7. Expense of sale
1 Totals			$	$	$	$

*STARTED YEAR WITH 40 HEAD OF CATTLE IN THE DAIRY HERD AND ENDED YEAR WITH 35 HEAD, MAKING A REDUCTION OF 5 HEAD.

2. Total net gain or loss (columns 4 plus 5 minus the sum of columns 6 and 7). Enter on line 2, Schedule D, page 2, Form 1040 $

See other side for Instructions and Computation of Alternative Tax

If a taxpayer claims that a sale of livestock is the sale of a capital asset, he should include an explanatory statement in his return to support his claim. For example, the farmer in the first illustration given should put the following statement on Schedule D (form 1040) "Started year with 40 head of dairy cattle in herd and ended year with 35 head, making a reduction of 5 head."

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, Inc., St. Louis 8, Mo.

QUESTIONS AND ANSWERS ON FEDERAL INCOME TAX

What options do farmers have with respect to methods of making out their Federal income-tax returns?

Farmers may compute their income either on the cash receipts and disbursements basis or the accrual basis, but whichever method is adopted in filing their first return must be followed until the consent of the Commissioner is received to compute the income upon a new basis.

Applications for permission to change the method of accounting employed and the basis upon which the return is made shall be filed within 90 days after the beginning of the taxable year to be covered by the return and should be addressed to the Commissioner of Internal Revenue, Washington 25, D. C.

What is the major difference between reporting on the cash and on the accrual basis?

On a **cash** basis, gross income includes all cash received during the taxable year from sales of farm products whether produced that or an earlier year, but does not include products sold on credit or changes in the inventory value of livestock and farm produce on the farm. The allowable business expenses include all expenses paid in **cash** during the year, for that year or any other year, but do not include expenses incurred and **not paid.**

On an **accrual** basis, gross income includes all income received or earned during the taxable year, from **that year's business only.** It includes cash sales, increases in the inventory value of livestock, supplies, and produce, plus any other income earned but not received. The allowable business expenses include all expenses for **that year's business only,** regardless of whether these expenses were paid, or incurred and unpaid.

If a return is made on a cash basis, the tables on pages 1 and 3 of form 1040 F are filled in; if the return is made on an accrual basis, the tables on pages 2 and 3 are filled in.

Which method of reporting should a farmer use?

If a farmer has a relatively constant cash income from year to year, he will probably find the cash basis the more satisfactory.

Growers of fruit, cabbage, potatoes, or other crops that may be stored and sold in the next tax year may find it desirable to report on the accrual basis, to prevent the possibility of having to pay a tax on two years' crops in one year. This may apply also to growers of nursery stock and to livestock raisers who may sell the production of more than one year during one tax-reporting period.

How should a farmer go about making the Federal return?

Assemble all the various financial records that are available concerning the farm business for the year.

Read carefully all instructions on forms 1040 and 1040F, especially those on page 4 of 1040F concerning **Expenses and Other Deductions.**

Fill in one set of forms 1040 and 1040F in pencil so that erasures can easily be made.

Also fill in one copy of Schedule D if the return involves the sale of capital assets.

Check the figures carefully, and note whether all questions have been answered.

Make **ink** copies of all forms for the Collector of Internal Revenue.

Keep the pencil copies of all forms. This is important. If the accuracy of the return is questioned by the Internal Revenue officials, the taxpayer will need to know exactly what he put down in the copy which he filed. The pencil copy will be needed also in preparing the next annual return, and, if a State return must be filed, will be useful in completing that.

On what things can a farmer deduct depreciation?

An allowance for depreciation of farm buildings, of improvements, such as fences and drains, and water systems, of machinery or other farm equipment of a permanent nature, and of commercial orchards and vineyards is deductible. Whether the return is made on **the cash or accrual basis,** depreciation on items of this nature is entered in the depreciation table on page 3 of form 1040F.

On the accrual basis, depreciation may also be taken on livestock kept for work, breeding, or dairy purposes irrespective of whether the animals were raised or purchased, **if not included in inventory.** On the cash basis, depreciation may be taken on livestock purchased but not on livestock raised.

There is no set rate of depreciation on farm property. The rate of depreciation is based on the estimated life **on the farm of the taxpayer** of the asset to be depreciated. Depreciation on the farmer's dwelling or on household equipment is not a deductible expense. Depreciation on a tenant house, however, is deductible.

How is depreciation on dairy cows and on work and breeding animals treated?

If the return is made on the cash basis, depreciation on livestock purchased may be entered in the depreciation table on page 3 of form 1040F in the same manner as depreciation on buildings and machinery. When reporting on the cash basis, no depreciation may be claimed on livestock raised

On the accrual basis, depreciation on livestock is usually accounted for by the reduced amount of the inventory at the end of the year.

How is depreciation on orchards and vineyards treated?

Depreciation on commercial orchards and vineyards (investment in trees or vines aside from the value of bare land) is allowed if on a reasonable basis. But if an orchard or vineyard has been grown by the present owner and the costs deducted on previous income-tax returns as **annual operating expenses,** then depreciation **cannot** be justified because the costs have already been charged off once.

There are no nation-wide or even state-wide "official" rates for calculating orchard or vineyard depreciation. The taxpayer should use his best judgment in estimating the probable length of the productive life of his orchard or vineyard.

How should costs of developing new orchards and improving land be treated?

Amounts spent in developing orchards and farms must in general be treated as capital investments. Some typical items the cost of which must be treated as capital investments are: clearing brush, trees, and stumps; leveling and conditioning land; the cost of trees and the planting of young orchards; installing tile drains, ditches, and irrigation systems; straightening creek beds; and constructing reservoirs, dams, and roads. The taxpayer may, however, treat as **either** capital investments or current expenses such expenditures during the development period of orchards, as cultivating and spraying of trees, taxes, and water for irrigation.

How about the hired man's income tax?

A hired man with a gross income of $600 is subject to the liability for filing a Federal return.

The gross income of a hired man includes his cash wages plus a fair value for board and lodging or for use of a house, and products supplied him, unless it is necessary for the hired worker to live on the employer's premises to fulfill his duties, as is usual on most farms.

How should the sale of a farm be reported?

The method of calculating and reporting the gain or loss from the sale of real estate is highly complicated. The sale of a farm may affect the income-tax obligations of the taxpayer by hundreds of dollars. It is, therefore, suggested that any person who sells a farm should get the assistance of an Internal Revenue official or an accountant or lawyer skilled in income-tax matters, in making his income-tax return.

What recourse does one have if his Federal income-tax return for a previous year is questioned by the Bureau of Internal Revenue and payment of an additional tax is requested?

If the return is questioned and, at a conference with a representative of the Bureau of Internal Revenue, payment of additional tax is required, the taxpayer may (1) ask for a so-called "30-day letter" explaining the basis for the additional tax; or (2) if it is clear to him that he owes the amount requested, he may sign a waiver and pay the additional tax.

If the taxpayer is not satisfied with the explanation contained in the "30-day" letter, he should not sign a waiver but should request a hearing before a representative of the Collector's Office or of the Internal Revenue Agent in Charge, whichever office sent the letter.

If a hearing is held with a representative of the Collector's Office and no agreement is reached, the taxpayer may request a hearing before a representative of the Internal Revenue Agent in Charge. If no agreement results from a hearing with the representative of the Internal Revenue Agent in Charge, the taxpayer may then request a hearing before the Technical Staff. These three steps are all available to the taxpayer without the necessity for court proceedings.

The receipt of a 30-day letter gives the taxpayer 30 days from the date of the letter in which to decide whether the additional tax is owed or whether he wishes to request a hearing.

Material on these two pages was selected from Cornell Extension Bulletin 779. No moral, financial, or legal responsibility is assumed by the authors or the Digest editors for actions based on their interpretations or suggestions. Such responsibility must rest with the individual taxpayer.

1950 INCOME TAX FOR FARMERS

The 1950 Revenue Act is very similar to the old 1948 income tax law -- except that the tax rate is higher. Some loop-holes were plugged but these affect few farmers. Beyond that there is not much new or different in the 1950 law.

Table I INCOME TAX COMPARISONS

Net Income Before Exemption	Amount of Tax Payable Under			Increase 1951 Over 1950 Calendar Year Basis
	Law Prior to 1950 Act	1950 Act: 1950 Calendar Year Base	1951	
SINGLE PERSON (NO DEPENDENTS)				
$ 600 or less	$ None	$ None	$ None	$ None
1,200	100	104	120	16
1,800	199	209	240	31
2,400	299	313	360	47
3,000	409	428	488	60
5,000	811	843	944	101
10,000	2,124	2,201	2,436	135
15,000	3,894	4,032	4,448	416
MARRIED PERSON (NO OTHER DEPENDENTS)				
1,200 or less	None	None	None	None
1,800	100	104	120	16
2,400	199	209	240	31
3,000	299	313	360	47
5,000	631	661	760	99
10,000	1,621	1,686	1,888	202
15,000	2,829	2,935	3,260	325
MARRIED PERSON (TWO OTHER DEPENDENTS)				
2,400 or less	None	None	None	None
3,000	100	104	120	16
5,000	432	452	420	68
10,000	1,361	1,417	1,592	175
15,000	2,512	2,607	2,900	293

How To Figure -- Actually, the method of figuring your *tentative* income tax for 1950 is exactly the same as last year. But, this year you can knock only 13 per cent off of the first $400 of tentative tax and 9 per cent off of all over $400, instead of 17 per cent and 12 per cent as you did last year. (Based on net incomes of less than $100,000).

The smaller deductions from your tentative tax means that on the same income you must pay about 5 per cent more income tax than in 1949. In 1951 all deductions from the tentative tax are eliminated -- so, your income taxes will go up again next year. For an idea of what it means to you in dollars, see Table 1.

Shifting Income to avoid higher tax rates in 1951 will not pay for most farmers. A $100 bill is a $100 bill, of course, but the practical farmer will not let all the talk about higher tax rates upset his farm plans.

As the law now stands, you would have to clear approximately $5,000 in 1951 (after subtracting operating costs and after taking out all allowable deductions) before the tax increase over 1950 amounts to as much as $100. To keep from paying this increase, some folks are trying to shift enough income into 1950 or defer enough expense into 1951 to offset the higher rates --

☞BUT WHOA!! -- Old man "Higher Bracket" is waiting! If you figure your income at $5,000, you'd have to shift $388 or more of taxable income into 1950 to keep your taxes from going up next year. However, when you do that, you wind up paying taxes on just that much more income in 1950. Net result -- if you are a single person, you actually save only $6 in the two years by shifting $388 of taxable income into 1950 -- if you are a married person, you save only $5 and have to shift $495 of income into 1950. The results will figure out differently at other tax levels, but for most farmers the possible savings are quite small.

Farm Management counts for a lot more than tax management. This is especially true right now in light of the changing farm outlook created by the war situation. The losses that can result if you neglect to buy repairs, parts, fertilizer, and supplies while they are available can be much heavier than any tax savings resulting from shifting expenses into 1951. Higher feed and seed prices can easily offset any tax gain if the normal season advances occur.

Table II SHIFTING NET INCOME

Tax Payer	Plan of Reporting	1950		1951		Total Tax Paid in Two Years
		Net Income*	Total Tax	Net Income*	Total Tax	
Single Person (No Dependents)	Normal	$5,000	$843	$5,000	$944	$1,787
	Adjusted	5,388	938	4,612	843	1,781
Married Person (No Other Dependents)	Normal	5,000	661	5,000	760	1,421
	Adjusted	5,495	755	4,505	661	1,416

*Net Income before allowing for dependents.

Premature sales of livestock and crops for purely income tax reasons can cheat you out of much needed income later. There is always the danger of a crop failure, a poor calf, pig, or lamb crop, drouth, flood, sickness or insects. When these strike, they cut income fast. It is always a good feeling to have some extra money coming in.

☞So, this fall, put the emphasis where it belongs -- on farm management. But don't just let income taxes take care of themselves either -- they are an important part of farm management.

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1950 INCOME TAXES FOR FARMERS

GOOD RECORDS COME FIRST

Before you can prepare an income tax return that will stand up, you have to have good records. Some of the largest and most costly tax cases trace back to inadequate records.

☞The best records are cancelled checks, duplicate bank deposit tickets, and receipted bills. All records supporting tax returns should be kept four years, except in the case of fixed assets such as machinery, equipment, buildings, autos, etc. The records on these should be held permanently.

Be sure to keep all records on improvements to homes, barns, other buildings, fences, tile lines, etc., because if you ever sell out, the cost of improvements is a part of the amount to be used in determining the profit or loss on the sale. Too often, improvements are overlooked or can't be proven, and tax benefits are lost as a result.

FARM EXPENSES

All farm expenses, except those classified as preparatory or development costs, are deductible from gross farm income in arriving at net farm income. (See Digest Page 486).

Preparatory Or Development Costs and money spent in improving land must be treated as a capital investment, not as current operating expenses in most cases. These costs include fencing, clearing and ditching or tiling of land in preparation for farming or grazing operations -- also the cost of constructing ponds, earthen dams, and terraces built at any time.

The expense of putting out an orchard is classed as development cost. But the cost of cultivating, pruning, fertilizing, and spraying to bring the trees into bearing may be reported either as a current expense or as a development cost, depending on the wishes of the taxpayer.

Building And Fence Repairs -- Use care in reporting such items. Usually small items are accepted as maintenance but big expenditures should, in most cases, be set up as an improvement and depreciated.

If you plan to build a shed on the barn and paint the whole barn at the same time treat them as two different jobs. Have the bills written up separately, and if you hire the work done, write two separate contracts. That way, there will be no question but that the paint job was a maintenance cost and 100 per cent deductible from current income.

Constructive Receipts -- Do not try to dodge income taxes by selling livestock or other commodities before January 1 and taking payment after the first of the year. The Revenue Department figures that you can collect anytime after you deliver, and the income is taxable.

Depreciation -- Set depreciation rates on livestock, buildings, machinery and equipment high enough to protect your interests from the beginning and then be consistent. The Revenue people may figure you are up to something if you ask for a change in the rate.

Land is not subject to depreciation. Neither is the farm home if you live in it (except to the extent that it is used in the farm business). A house occupied by a tenant or laborer can be depreciated.

SALE OF "USED LIVESTOCK"

Certain sales of livestock (used in the farm business) come under the "capital gains" provision of the income tax law. Only 50 per cent of the profits from such sales are taxable. Unfortunately, the situation regarding this regulation (117-J) is very confused at the present time and some folks are taking big chances.

The Revenue Department still sticks to its old definition. The taxpayer must prove that the animals were used for dairy breeding, or work purposes; and the sale was made to reduce the size of the herd or make room for replacements to change the quality or breed of the herd -- this, despite losing the Albright case in the St. Louis Circuit Court.

In the Albright decision it was held that ordinary sales of milk cows come under this provision. The Revenue Department has not yet appealed this and similar decisions to the Supreme Court. Meantime, if you claim tax relief based on this ruling, be prepared to fight the case in court or pay penalties.

☞Perhaps the practical method for most farmers where only a few hundred dollars are involved is to go ahead and pay taxes on the full income. Then watch developments and file for refund before your tax file is legally retired. You can keep your 1948 tax return alive for another 2 years by filing an amended return and asking for a refund on or before the 2nd anniversary of the filing date. The situation should be pretty well cleared up by 1952. Working it this way, you run little risk and stand to gain if the Albright decision is not reversed.

Some big operators will prefer to follow the Albright lead or support others in an effort to get more favorable decisions. Such efforts should be undertaken only with expert legal advice from a competent tax attorney.

We are frequently asked to recommend a good farm bookkeeping system. The Ideal Farm and Ranch Income Tax Record, Jr. is a good looseleaf system in a durable binder. Extra pages and refills may be ordered as needed. The initial cost is $2.00 (add 15 cents for postage and handling). We keep these books in stock and you may order from us if you wish.

1949 – INCOME TAXES – 1950

It is time to shape up your farm business to help regulate the income tax you must pay. Do not make the mistake of waiting until January 1 to begin figuring your taxes. It is too late then to do anything about them.

☞ The effect on income taxes should be considered BEFORE any major transaction is completed -- regardless of the time of year, but all the more important now.

☞ As the year-end approaches -- look ahead to the probable profits for this year and next year. Then do what you can to equalize the net income between this year and next. You pay less tax on a steady income than on a fluctuating income.

The long-time trend of taxes is UP -- the Federal Government is now in the red several billion dollars -- therefore, when other things are equal, keep your tax position current.

Mr. Truman has expressed himself as favoring higher taxes next year. But, 1950 is an election year. So, it is reasonably safe to assume that increases, if any, will be minor, especially on net incomes of $5,000 or less. Higher tax rates are possible, but not likely.

Farm Profits Will Be Down on most farms next year and the down trend will continue for several years. Even with supports, farm expenses will take a bigger and bigger bite out of total farm income.

The favorable weather and big crops of 1948 and 1949 will not continue without a break....

☞ Therefore, DO NOT pay taxes on big profits this year if part of your income can be deferred into 1950 -- unless you feel certain that you will net as much or more next year.

This suggestion is doubly important for farmers in the hazardous farming areas, where drouth, floods, storms, insects, etc. make farm income from year to year uncertain.

SPEND TO SAVE

For those who anticipate lower net profits next year, it should be good business to buy as much feed, seed, fertilizer and limestone as you will need for the coming season. There will be less advantage in buying things like fence wire, farm machinery and building needs.

Current shortages are the result of strikes and should pass quickly once these are settled. And, there is also a possibility that prices on these items will be a little lower next year.

GOOD RECORDS ARE IMPORTANT

"If I were to pick a 'Key note' theme for this year, it would be RECORDS" writes M. M. Winkler, Certified Public Accountant of Tupelo, Mississippi. "Some of our largest tax cases, and most costly, arose from the lack of adequate records."

☞ The best records are cancelled checks, duplicate bank deposit tickets and paid bills. All records supporting tax returns should be kept for four years, except in the case of fixed assets such as machinery, equipment, buildings, autos, etc. The records on these should be held permanently.

Especially keep all records on improvements to the homes, barns, other buildings, fences, tile lines, etc. because if you ever sell out, the cost of improvements is a part of the amount to be used in determining the profit or loss on the sale. Too often improvements are overlooked or can't be proven, and tax benefits are lost as a result.

CASH OR ACCRUAL BASIS

The principle difference between the cash and the accrual basis of reporting farm income is in the method of handling current income and expense.

Cash Basis -- On the cash basis a farmer can deduct only those expenses actually paid during the year. As income he reports only actual income received during the year. Most of the statements on this page about managing income taxes refer to the cash basis because most operators report on this basis.

Accrual Basis -- On the accrual basis a farmer reports all expenses as they are incurred whether paid or not. As income, he reports all income produced during the year whether received or not. Advanced or deferred selling and buying has no objective for those who report on a accrual basis. They can manage their farm business without worrying about how day to day transactions affect income taxes.

FARM EXPENSES

All farm expenses, except those classified as Preparatory or Development Costs, are deductible from gross farm income in arriving at net farm income. (See Digest Page 486).

Preparatory or Development Costs are not deductible. They must be treated as an added capital investment, just like land and buildings. Typical of these preparatory items which

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are not deductible are the cost of fencing, clearing, ditching or tiling land in preparation for farming or grazing operations. The expense of planting an orchard is classed as development cost. But the cost of cultivating, pruning, fertilizing, and spraying to bring the trees into bearing may be reported either as a current expense or as a development cost, depending on the wishes of the taxpayer.

Building and Fence Repairs -- Use care in reporting such items. Usually small items are accepted as maintenance but big expenditures should, in most cases, be set up as an improvement and depreciated.

If you plan to build a shed on the barn and paint the whole barn at the same time treat them as two different jobs. Have the bills written up separately, and if you hire the work done, write two separate contracts. That way there will be no question but that the paint job was a maintenance cost and 100 per cent deductible from current income.

Constructive Receipts -- Do not try to dodge income taxes by selling cattle before January 1 and taking payment after the first of the year. The Revenue Department figures that you can collect anytime after you deliver the cattle. The income is taxable.

Depreciation -- Set depreciation rates high enough to protect your interests from the beginning and then be consistent. The Revenue people figure you are up to something when you ask for a change. Land is not subject to depreciation. Neither is the farm home if you live in it (except to the extent that it is used as an office and to board hired help).

SALE OF "USED LIVESTOCK"

Much confusion and many abuses have grown out of the tax laws covering capital gains and losses in relation to the sale of livestock. Ordinary sales of livestock do not come under the provisions of this law.

☞ It is only when the size of your breeding herd is being reduced that it is possible to claim the sale of capital assets or "Used Livestock". The capital gain from such sales is subject to a tax of not more than 25 per cent provided you have owned them 6 months or more. If the sale resulted in a loss the entire amount of the loss is deductible.

☞ Recently a lot of publicity has been given to a new tax court ruling that seems to permit sales of all breeding stock to be reported as used livestock -- whether the herd was reduced or not.

☞ The case which was held in favor of the taxpayer has not gone to the Supreme Court. Other tax districts may not allow the reduction. Before you decide to claim income tax relief based on this ruling -- better realize that you may have to fight the case and/or pay penalties.

SPLIT INCOME AND JOINT RETURNS

The law permits married persons to split their income for Federal Income Tax purposes. Both regular income and capital gains or losses may be split. But, farmers with less than a $3600 taxable income receive no benefit. Single persons get no relief under this provision of the law.

FAMILY PARTNERSHIP

The Supreme Court in the case of Collector of Internal Revenue vs. Culbertson, U. S. 69 S., Ct. 1210, was to determine whether a father and four sons had entered into a valid partnership in conducting a cattle raising business. It was sent back to the Tax Court to apply appropriate legal explanation.

The Chief Justice said, "if, upon a consideration of all the facts, it is found that the partners joined together in good faith to conduct a business, having agreed that the service or capital to be contributed presently by each is of such value to the partnership that the contribution should participate in the distribution of profits, that is sufficient."

DEPENDENTS' EXEMPTION

The taxpayer is allowed a $600 exemption for himself and each dependent. He can claim as dependents only those who meet these specific requirements.

1. Receive more than one-half of their support from the taxpayer.

2. Closely related to taxpayer. In addition to the wife (or husband) only the following may be claimed: Own children or grandchildren, parents or grandparents, brother, sister, uncle or aunt (only if brother or sister of parents), nephew or niece (only if child of brother or sister), step children, step parents, step brother, or sister, half brother or sister, son or daughter-in-law, father or mother-in-law, and brother or sister-in-law.

3. Receives less than $500 gross income.

4. Dependent (if married) has not filed a joint return with the other spouse.

Exemption For Old Age -- Taxpayers over 65 years old are entitled to an additional $600 exemption. On a joint return, both husband and wife may claim an exemption if over 65.

Exemption For The Blind -- A blind taxpayer is allowed an additional $600 exemption over and above all other credits or exemptions.

DEPRECIATION AND INCOME TAXES

Depreciation is an estimated operating expense covering wear, tear, exhaustion, and obsolescence of property used in the farm business.

Annual depreciation allowance represents that portion of the purchase price or value of the item which was used up during the current tax year. Depreciation can easily run from 5 to 10 percent of gross income and is becoming a more important farm operating cost each year.

METHODS TO USE

Three different methods can be used to determine the annual depreciation allowance.

The Straight Line Method is most common. Yearly depreciation is determined by dividing the purchase price by the total number of years the owner estimates the item will last.

EXAMPLE: Brown purchases a tractor costing $2000. He estimates its normal life to be 10 years. Annual depreciation is $200 ($2000 ÷ 10). At the end of 10 years he will have recovered the entire cost.

Unit Of Production Method is not often used by farmers except when setting up depreciation allowances of natural resources such as mineral deposits or timber. It can be used for farm machinery. Total life is based on production rather than years. Generally this method is not too desirable for most farmers.

EXAMPLE: Smith purchases a combine for $2500. He estimates that it will cut 2500 acres during its normal life. His unit depreciation rate is $1.00 per acre ($2500 ÷ 2500 acres). The first year he combines 300 acres. His depreciation is $300 (300 acres x $1.00) for that year.

Declining Balance Method -- Under this plan the amount of depreciation is subtracted annually from the cost and the rate applied only to the resulting balance. Depreciation is largest the first year and declines each year thereafter. This method is tricky. It should be used only when the item isn't held very long. Depreciation rate must be higher than in straight line method.

EXAMPLE: Jones purchased a tractor for $2000. He uses a depreciation rate of 15% per year. His first year's depreciation will be $300. (.15 x $2000). The second year depreciation would be $255 (.15 x $1700). The third year it would be $216.75 (.15 x $1445). Each year depreciation continues to decline.

The best method for most farmers is the straight line plan. When a plan is chosen it should be used for all items.

LIFE EXPECTANCY

No "official" or average life expectancies can be applied to all farms. Each taxpayer must estimate the expected life for each item.

Guides for estimating useful life of various items of farm property are published by the Bureau of Internal Revenue. The table on page 482 is taken from Bulletin "F" and shows the more common estimates.

Only depreciation for the current year may be deducted. Depreciation which was allowable but not taken in past years cannot be deducted from income of the current year. Depreciation not previously claimed counts against you when determining the gain or loss from the sale of depreciable property.

BE CONSISTENT

You must be consistent from year to year in the method used to figure depreciation and in the amount claimed on each item. Any change from methods used in earlier years and every change in the amount of depreciation claimed should be explained at the bottom of the schedule on Form 1040 F.

Give reasons why it was necessary to change from other methods or why the amount was changed.

When the estimated life of any depreciable item is shortened or lengthened by increasing or decreasing its use or by making major improvements, it will be necessary to establish a new number of "years of life". Include the cost of the improvements in the depreciation schedule for the year in which the improvements were made.

EXAMPLE: A major overhaul job on a tractor would add to its years of life and would be depreciated. The cost of the overhaul would be added to the present depreciated value and a new schedule would be worked out using a new length of life.

WHAT TO DEPRECIATE

Depreciation can be taken on tile, fence, machinery, equipment and all farm buildings, except the dwelling that is owned and occupied by the taxpayer. If the owner of the property does not live in the farm dwelling he can also depreciate it. Total depreciation claimed should not be based on replacement costs. It is based on cost or value when acquired plus any improvements.

Grouping of livestock and small equipment on the schedule 1040 F is allowed. But the grouping should be made from totaling a detailed individual list kept current in a permanent farm record book.

Selected from Bulletin "F" and Special Circular 12, University of Wisconsin.

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ESTIMATED USEFUL LIFE AND DEPRECIATION RATES

The following table shows estimated useful life for various items used in farming. This information is taken from the Bulletin "F", U.S. Treasury Department. This table is only an estimate or guide and actual life may vary depending on use.

AVERAGE USEFUL LIFE -- YEARS

Animals:	
Cattle, breeding or dairy	8
Goats, breeding	5
Hogs, breeding	5
Horses, breeding or work	10
Mules, work	10
Sheep, breeding	5
Barrels, dip	6
Beehives	10
Benches	20
Binders:	
Corn	12
Grain	14
Bins	20
Boilers	20
Bunchers, clover	15
Burners, oil	15
Cables	8
Canals:	
Steel and concrete	50
Wood syphon	25
Canning machines	15
Carriers:	
Feed	20
Hay	25
Litter	5
Carts:	
Dump and farm	8
Hand	5
Cellars, root	30
Cesspools	15
Cisterns	33
Cleaners and graders	15
Clippers, horse	8
Conveyors and elevators	15
Covers, canvas	8
Cribs, corn	30
Crushers, corn and cob	15
Cultivators	15
Culverts:	
Masonry and cast-iron pipe	50
Galvanized corrugated iron	25
Riveted steel	33
Cups, turpentine	5
Cutters:	
Feed	12
Rotary stump	20
Diggers, potato	15
Distributors, fertilizer	12
Drills:	
Grain	15
Well	10
Dross plants	10
Elevator machinery, grain	18
Elevator and wagon dump, grain	12
Pullers, beet	18
Pullers, and grubbers, stump	20
Pulverizers, limestone	10
Pumps:	
Bucket	22
Centrifugal or rotary	20
Plunger	15
Racks:	
Feed	10
Hay and stack	15
Rakes	15
Refrigerators, electric	15
Saddles	10
Saws, circular	15
Scales:	
Portable	15
Truck or wagon	25
Seeders all types	18
Separators, cream or grain	15
Setters, plant	12
Shearing machines, hand and power	18
Shellers, corn	20
Shredders	15
Silos:	
Concrete	50
Metal	25
Wooden	20
Sleds and sleighs	15
Smudge pots	10
Sorters, potato	20
Sowers:	
Grain, broadcast	15
Lime	8
Sprayers	15
Spreaders, manure	15
Stackers, hay	20
Subsoilers	10
Engines:	
Gasoline	10
Diesel	15
Stationary, steam	20
Traction, steam	20
Feeders	8
Fence machines	5
Fence posts, steel	30
Fences:	
Snow	8
Wood	15
Fencing, woven wire	15
Flumes	25
Forges, portable	12
Fumigators	10
Furnaces:	
Evaporator, dry	15
Heating	20
Furrow openers, disk	15
Gates, farm	15
Generators, gas, acetylene	15
Grinders, grain and feed	15
Groves. (See Trees and Vines.)	
Harness	7
Harrows	15
Harvesters, grain	15
Headers	15
Hoists and forks, hay	12
Hullers, clover and alfalfa	15
Huskers	15
Ice boxes	12
Ice harvesting and hoisting machinery	10
Incubators and brooders	15
Laboratory equipment	10
Listers	15
Loaders, hay and seed	10
Milking machines	20
Mills and presses, cider	15
Mills:	
Corn, portable	12
Feed	15
Grist	25
Smut	15
Mowers:	
Farm	14
Lawn	8
Orchard tools	7
Orchards. (See Trees and Vines.)	
Packing tools	10
Pens	20
Picking machines	5
Planters	15
Plows	15
Press, hay, baling	12
Tanks:	
Grain --	
Concrete	50
Metal	25
Turpentine	5
Wagon	10
Water --	
Steel	40
Wood	20
Watering	20
Tarpaulins	8
Threshing machines	15
Tractors	10
Trees and vines:	
Almond	40
Apple	50
Apricot	25
Banana	10
Cherry	50
Fig	60
Grape	33
Grapefruit	40
Lemon	40
Nectarine	15
Olive	50
Orange	40
Peach	15
Pear	40
Plum	33
Prune	33
Walnut	40
Troughs, iron and steel	15
Vats, dipping	10
Wagon beds and racks	6
Wagon gear -- wood wheels	12
Wagons:	
Light	12
Trucking, heavy duty	10
Weighers, and baggage, grain	20
Windmills	20

INCOME TAX DEPRECIATION AND OBSOLESCENCE ESTIMATED USEFUL LIVES AND DEPRECIATION RATES

U. S. Treasury Department - - Bureau of Internal Revenue

Selected Sections From BULLETIN "F" (Revised January 1942)

This bulletin supersedes Bulletin "F" (revised January 1931) and "Depreciation Studies" (published January 1931). It contains information and statistical data relating to the determination of deductions for depreciation and obsolescence, from which taxpayers and their counsel may obtain the best available indication of Bureau practice and the trend and tendency of official opinion in the administration of pertinent provisions of the Internal Revenue Code and corresponding or similar provisions of prior Revenue Acts. It does not have the force and effect of a Treasury Decision and does not commit the Department to any interpretation of the law which has not been formally approved and promulgated by the Secretary of the Treasury.

DEPRECIATION—OBSOLESCENCE—DEFINITIONS

The Federal income tax in general is based upon net income of a specified period designated as the taxable year. The production of net income usually involves the use of capital assets which wear out, become exhausted, or are consumed in such use. The wearing out, exhaustion, or consumption usually is gradual, extending over a period of years. It is ordinarily called depreciation, and the period over which it extends is the normal useful life of the asset.

Depreciation.—A reasonable allowance for the exhaustion, wear and tear of property used in the trade or business, including a reasonable allowance for obsolescence.

The factors of wear and tear and decay cause physical exhaustion, or deterioration, ultimately resulting in retirement of the property, while those retirements due to obsolescence are caused by forces ordinarily unrelated to physical condition.

Obsolescence may be defined as the process of becoming obsolete due to progress of the arts and sciences, changed economic conditions, legislation, or otherwise, which ultimately results in the retirement or other disposition of property. As said by the Supreme Court in *United States Cartridge Co.* v. *United States* (1932) (281 U. S. 511, 516, Ct. D. 460, C. B. XI–1, 282, 283 (1932)), "Obsolescence may arise from changes in the art, shifting of business centers, loss of trade, inadequacy, supersession, prohibitory laws and other things which, apart from physical deterioration, operate to cause plant elements or the plant as a whole to suffer diminution in value."

With respect to any property for which past experience indicates a gradual lessening of useful value due to inadequacy or obsolescence and when the effects of such factors can be expected to continue without substantial variation, the annual diminution in useful value is considered ordinary or normal obsolescence to be included in depreciation. Much of the discussion hereinafter having specific reference to depreciation only is in fact equally applicable to normal obsolescence.

BASIS FOR ALLOWANCE OF DEPRECIATION AND OBSOLESCENCE

The basis for computing the amount deductible on account of depreciation and obsolescence of property acquired after February 28, 1913, is, in general, the cost of such property.

To the cost or other basis of the property there should be added, when acquired or completed, the cost of additions, improvements, and betterments, and from it should be deducted the cost of all property when retired, abandoned, sold, destroyed, or otherwise disposed of. The cost of installation, as well as the freight charges thereon, are capital expenditures to be added to the cost of the property recoverable through depreciation deductions.

In the case of the acquisition on or after March 1, 1913, of a combination of depreciable and nondepreciable property for a lump price, the capital sum to be recovered through depreciation allowances is limited to an amount representing under all the circumstances a reasonable allocation out of the total cost of all the property to that portion of the property subject to depreciation.

ALLOWANCE FOR DEPRECIATION AND OBSOLESCENCE

The proper allowance for exhaustion, wear and tear, including obsolescence, of property used in trade or business is that amount which should be set aside for the taxable year in accordance with a reasonably consistent plan (not necessarily at a uniform rate) whereby the aggregate of the amounts so set aside, plus the salvage value, will, at the end of the useful life of the property in the business, equal the cost or other basis of the property. In no instance may the total amount allowed be in excess of the amount represented by the difference between the cost or other allowable basis and the salvage value which reasonably may be expected to remain at the end of the useful life of the property in the trade or business.

The allowance in any given year must be determined in accordance with the conditions existing at the end of the year, and a taxpayer is not permitted under the law to take advantage in later years of his prior failure to take any depreciation deduction or of his action in taking deductions plainly inadequate under the known facts in prior years.

METHODS OF APPORTIONMENT

The capital sum to be replaced by allowances for depreciation over the useful life of the property may either be deducted in equal annual installments or in accordance with any other recognized trade practice, such as apportionment to units of production. While no specific method is prescribed, whatever plan or method of apportionment is adopted must be reasonable and cannot be changed in a later year without the consent of the Commissioner. The methods in general use by taxpayers are the "straight-line" and the "unit of production." the latter being used for the most part by taxpayers owning natural resource property. These, with other methods used to a lesser extent, are described below.

STRAIGHT-LINE METHOD

Under this method, the cost or other basis of the property, less its estimated salvage value, is deducted in equal annual installments over the period of its estimated useful life. Ordinarily, the depreciation deduction is computed by applying a depreciation rate expressed as a percentage to the cost or other basis to be recovered, but it also may be computed by dividing that cost or other basis by the estimated useful life. The estimated useful life is subject to modification in the light of conditions known to exist at the end of each taxable period. Ordinarily, depreciation computed by this method represents the actual diminution in service value from year to year as closely as the depreciation computed by any other method. The practical simplicity in accounting records required and the ease and facility by which revisions or changing life estimates may be applied tend to make this method the most acceptable one for general use.

UNIT OF PRODUCTION METHOD

This method is peculiarly applicable in determining depreciation for property used in the exploitation of natural resources, such as mineral deposits or timber, the available reserves of which limit the useful life of the depreciable property. Under such circumstances, the rate of exhaustion of the natural resource measures the useful life of the physical property. By dividing the cost or other basis less estimated salvage value by the estimated available reserves of raw material, a unit cost is obtained which, when multiplied by the units produced during a given year, gives the depreciation sustained for that year. Depreciation, at least to the extent of that based upon decay and normal obsolescence, is allowable and should be deducted during the period when property is idle or is producing at a rate below normal.

DECLINING BALANCE METHOD

Under this method the amount of depreciation is subtracted annually from the cost or other basis of the property and the rate applied only to the resulting balances. Depreciation on any single item is largest in amount the first year and declines each year thereafter. This method gives satisfactory results for accounts that are being constantly replaced in substantially equal amounts, provided the rate used is somewhat higher than that applicable under the straight-line method. Its best application is to those accounts for property in which the greater proportion of the production is confined to the early part of the useful life.

DEPRECIABLE PROPERTY ACCOUNTS

Additions and reductions.—The depreciable asset account should be charged with the cost or other basis of all depreciable property acquired, and credited with the cost or other basis of all assets disposed of through sale, retirement, abandonment, casualty, or otherwise.

Depreciation reserve.—This account should be credited with depreciation and obsolescence allowed or allowable, whichever is greater, in each taxable year. The full cost or other basis of all normal retirements adjusted for salvage should be charged to the account. When assets are sold, transferred, or retired because of casualty or special obsolescence, the account should be charged only with the depreciation and obsolescence accrued.

Salvage.—Salvage value is the amount realizable from the sale or other disposition of items recovered when property has become no longer useful in the taxpayer's business and is demolished, dismantled, or retired from service. When reduced by the cost of demolishing, dismantling, and removal, it is referred to as net salvage. In principle, the estimated net salvage should serve to reduce depreciation, either through a reduction in the basis on which depreciation is computed or a reduction in the rate. In either instance the amount of net salvage should actually, or in effect, be a credit to the depreciation reserve. Where the basis or rate for depreciation is not reduced for estimated salvage, all net receipts from salvage should be considered income.

Repairs.—The cost of incidental repairs which neither materially add to the value of the property nor appreciably prolong its life, but merely keep it in an ordinarily efficient operating condition, may be deducted as expense items.

Replacements.—Amounts spent in restoring property or in making good the exhaustion thereof, for which an allowance is or has been made, or amounts spent for replacements which arrest deterioration and appreciably prolong the life of the property, are capital expenditures and, strictly speaking, should be accounted for by deducting from the asset account the cost of the item or part thereof which is replaced, and adding to the capital account the cost of the new part plus the cost of installation. The cost of the item removed (adjusted for salvage, if any) should be charged to the depreciation reserve. As a practical matter, it is permissible to charge the cost of rehabilitations or small replacements directly to the depreciation reserve, leaving the capital account undisturbed, provided there has been no material change in price levels and no substantial improvement in the new equipment. Replacements in the nature of betterments, however, should always be added to the depreciable asset account.

PREPARATION OF SCHEDULES

In order that verification of depreciation allowances claimed by taxpayers may be facilitated, schedules should be submitted. A separate schedule should be prepared for each class or group of assets for which depreciation is separately determined. Where a taxpayer maintains a record of depreciation by individual items, the data should be summarized in such a manner as to present an accurate statement of each distinctly different class of depreciable assets and of the reserve that has been accrued against each class for income tax purposes.

ESTIMATED AVERAGE USEFUL LIVES AND DEPRECIATION RATES

A reasonable rate for depreciation is dependent not only on the prospective useful life of the property when acquired, but also on the particular conditions under which the property is used as reflected in the taxpayer's operating policy and the accounting policy followed with respect to repairs, maintenance, replacements, charges to the capital asset account and to the depreciation reserve. If the useful life of the various assets shown hereafter could be determined precisely, which can not be done, there still could not be established standard rates of depreciation unless there existed standard methods of operation and of accounting from which there could be no deviation.

Being based on the usual experience of property owners, the probable useful lives shown herein for each kind or class of assets are predicated on a reasonable expense policy as to the cost of repairs and maintenance. Therefore, in the determination of the depreciation allowance in each case, due consideration should be given the maintenance and replacement policy of the taxpayer and the accounting practice regarding the same.

The estimates of useful life set forth herein are for new properties only. In applying them, consideration should be given to salvage values, to that portion of the service life already expired, and to that portion of the cost previously recovered or recoverable through prior depreciation deductions or other allowances.

It has been found that normal obsolescence is a very important factor in determining the useful life of property. The estimated useful lives shown herein include an allowance for normal obsolescence, but do not contain any provision for extraordinary obsolescence, such as is occasioned by revolutionary inventions, abnormal growth or development, radical economic changes, or other unpredictable factors which may force the retirement or other disposition of property prior to the termination of its normal useful life.

LIVES OF DEPRECIABLE PROPERTY

In this compilation are listed for each industry the useful lives of various assets, including wherever practicable lives for composite accounts and group accounts. The lives for buildings and building equipment, power generating equipment, office equipment, and motors and other vehicles are shown separately; and, unless specifically mentioned in the text, these assets are not included in the composite lives indicated herein. All lives are given without fractional years. In practice, however, fractions may be used.

BUILDINGS

The useful life of a building for business purposes depends to a large extent on the suitability of the structure to its use and location, its architectural quality, the rate of change in population, the shifting of land values, as well as the extent of maintenance and rehabilitations.

The extent to which the equipment of a building, such as heating, plumbing, electrical wiring and fixtures, elevators, and other improvements, must be replaced is an important factor in determining the over-all rate of depreciation to be applied to the building and its equipment. Such a rate contemplates that the cost of new equipment will be capitalized, and that the cost of the equipment replaced will be charged to the depreciation reserve. In instances, however, where it is not feasible to determine the cost of the old equipment, the cost of the new equipment may be charged to the depreciation reserve. Where this method of accounting is followed and in the absence of special circumstances, the composite rates of depreciation set forth in the table below are considered reasonable:

	Composite rate (percent)		
	Type of construction		
	Good	Average	Cheap
Apartments	2½	2½	3
Banks	2	2	2½
Dwellings	2	2½	3
Factories	2½	2½	3
Farm buildings	2	2	2½
Garages	2	2½	3
Grain elevators	1½	2	2½
Hotels	2½	2½	3
Loft buildings	2	2	3
Machine shops	2	2½	3
Office buildings	2	2½	3
Stores	2	2	2½
Theaters	2½	3	3½
Warehouses	1½	2	2½

Where, however, the building equipment is set up as a separate account for depreciation purposes, the above composite rates are not applicable and the appropriate rate should be determined by reference to the table of useful lives indicated below, which are considered reasonable for buildings of standard or sound construction:

Total life (years)

Apartments	50	Hotels	50
Banks	67	Loft buildings	67
Dwellings	60	Machine shops	60
Factories	50	Office buildings	67
Farm buildings	60	Stores	67
Garages	60	Theaters	50
Grain elevators	75	Warehouses	75

AGRICULTURE

The lives set forth pertain to the prime producers in agriculture. On a composite basis, agricultural property is generally divided into buildings, taking approximately a 50-year average life, and machinery and equipment, taking a 15-year average life.

Item lives for the various assets used in agriculture are tabulated as follows:

Average useful life (years)

Animals:	
Cattle, breeding or dairy	8
Goats, breeding	5
Hogs, breeding	5
Horses, breeding or work	10
Mules, work	10
Sheep, breeding	5
Barrels, dip	6
Beehives	10
Benches	20
Binders:	
Corn	12
Grain	14
Bins	20
Boilers	20
Bunchers, clover	15
Burners, oil	15
Cables	8
Canals:	
Steel and concrete	50
Wood syphon	25
Canning machines	15
Carriers:	
Feed	20
Hay	25
Litter	5
Carts:	
Dump and farm	8
Hand	5
Cellars, root	30
Cesspools	15
Cisterns	33
Cleaners and graders	15
Clippers, horse	8
Conveyors and elevators	15
Covers, canvas	8
Cribs, corn	30
Crushers, corn and cob	15
Cultivators	15
Culverts:	
Masonry and cast-iron pipe	50
Galvanized corrugated iron	25
Riveted steel	33
Cups, turpentine	5
Cutters:	
Feed	12
Rotary stump	20
Diggers, potato	15
Distributors, fertilizer	12
Drills:	
Grain	15
Well	10
Dross plants	10
Elevator machinery, grain	18
Elevator and wagon dump, grain	12
Pullers, beet	18
Pullers and grubbers, stump	20
Pulverizers, limestone	10
Pumps:	
Bucket	22
Centrifugal or rotary	20
Plunger	15
Racks:	
Feed	10
Hay and stack	15
Rakes	15
Refrigerators, electric	15
Saddles	10
Saws, circular	15
Scales:	
Portable	15
Truck or wagon	25
Seeders, all types	18
Separators, cream or grain	15
Setters, plant	12
Shearing machines, hand and power	18
Shellers, corn	20
Shredders	15
Silos:	
Concrete	50
Metal	25
Wooden	20
Sleds and sleighs	15
Smudge pots	10
Sorters, potato	20
Sowers:	
Grain, broadcast	15
Lime	8
Sprayers	15
Spreaders, manure	15
Stackers, hay	20
Subsoilers	10

Engines:	
Gasoline	10
Diesel	15
Stationary, steam	20
Traction, steam	20
Feeders	8
Fence machines	5
Fence posts, steel	30
Fences:	
Snow	8
Wood	15
Fencing, woven wire	15
Flumes	25
Forges, portable	12
Fumigators	10
Furnaces:	
Evaporator, dry	15
Heating	20
Furrow openers, disk	15
Gates, farm	15
Generators, gas, acetylene	15
Grinders, grain and feed	15
Groves. (*See* Trees and vines.)	
Harness	7
Harrows	15
Harvesters, grain	15
Headers	15
Hoists and forks, hay	12
Hullers, clover and alfalfa	15
Huskers	15
Ice boxes	12
Ice harvesting and hoisting machinery	10
Incubators and brooders	15
Laboratory equipment	10
Listers	15
Loaders, hay and seed	10
Milking machines	20
Mills and presses, cider	15
Mills:	
Corn, portable	12
Feed	15
Grist	25
Smut	15
Mowers:	
Farm	14
Lawn	8
Orchard tools	7
Orchards. (*See* Trees and vines.)	
Packing tools	10
Pens	20
Picking machines	5
Planters	15
Plows	15
Press, hay, baling	12
Tanks:	
Grain—	
Concrete	50
Metal	25
Turpentine	5
Wagon	10
Water—	
Steel	40
Wood	20
Watering	20
Tarpaulins	8
Threshing machines	15
Tractors	10
Trees and vines:	
Almond	40
Apple	50
Apricot	25
Banana	10
Cherry	50
Fig	60
Grape	33
Grapefruit	40
Lemon	40
Nectarine	15
Olive	50
Orange	40
Peach	15
Pear	40
Plum	33
Prune	33
Walnut	40
Troughs, iron and steel	15
Vats, dipping	10
Wagon beds and racks	6
Wagon gear—wood wheels	12
Wagons:	
Light	12
Trucking, heavy duty	10
Weighers and baggage, grain	20
Windmills	20

USEFUL LIFE AND DEPRECIATION RATES

The following tables give estimated useful life for buildings, equipment, and motor vehicles. They are taken from Bulletin "F", U.S. Treasury Department.

BUILDINGS

The useful life of a building depends on the suitability of the structure, its quality, change in population, the shifting of land values, and maintenance and rehabilitation.

The extent to which the equipment of a building must be replaced is an important factor in determining the over-all rate of depreciation. Such a rate contemplates that the cost of new equipment will be capitalized, and that the cost of the equipment replaced will be charged to the depreciation reserve.

COMPOSITE RATE (PERCENT)

	Type of Construction		
	Good	Average	Cheap
Apartments	2½	2½	3
Banks	2	2	2½
Dwellings	2	2½	3
Factories	2¼	2½	3
Loft buildings	2	2	3
Machines shops	2	2½	3
Office buildings	2	2½	3

	Type of Construction		
	Good	Average	Cheap
Farm Buildings	2	2	2½
Garages	2	2½	3
Grain elevators	1½	2	2½
Hotels	2½	2½	3
Stores	2	2	2½
Theaters	2½	3	3½
Warehouses	1½	2	2½

If the building equipment is set up as a separate account for depreciation purposes, the above composite rates are not applicable and the appropriate rate should be determined by reference to the table of useful lives indicated below. These are considered reasonable for buildings of standard or sound construction.

TOTAL LIFE (YEARS)

Apartments	50
Loft buildings	67
Factories	50
Stores	67
Hotels	50
Dwellings	60
Office buildings	67
Garages	60
Banks	67
Machine shops	60
Farm buildings	60
Theaters	50
Grain elevators	75
Warehouses	75

BUILDING EQUIPMENT (AVERAGE USEFUL LIFE YEARS)

Heaters, electric	10
Heaters, gas	15
Heating systems:	
Broilers and furnaces	20
Burner equipment --	
Gas	16
Oil	10
Radiators	25
Lighting systems:	
Conduits and fittings*	
Wiring	20
Fixtures	15
Pumps:	
Suction, pressure and sump	13
Plumbing:	
Faucets & flushing valves	15
Bath tubs, lavatories toilet bowls, etc.	25
Pipes --	
Brass or copper*	
Iron, cold-water	25
Iron, hot-water or steam	20
Sewer, cast-iron or vitrified*	
Valves --	
Brass body*	
Iron body	20
Roofs:	
Asbestos	25
Asphalt and tar (prepared)	15
Galvanized iron --	
Light or cold dipped	15
Heavy or hot dipped	20
Tar & gravel (5-ply)	20
Tarred felt	10
Copper*	
Slate*	
Tile*	
Tin*	
Starters, electric	20
Tanks and vats, water:	
Metal	25
Wood	15
Telephone equipment:	
Conduits and fitting*	
Wiring and fixtures	20
Tools, small	5
Transformers	25
Trucks, conveyance (within building)	10
Trucks, lift	15
Wells & well pumps	25

*Life of building

MOTOR AND OTHER VEHICLES

Motor vehicles included in this classification are those used by commercial enterprises other than public utility and construction. Lives considered reasonable are indicated below.

Automobiles:	Years
Passenger	5
Salesman	3
Horse-drawn vehicles	8
Motorcycles	4
Tractors	6
Trailers	6

Trucks	Years
Outside use --	
Electric	10
Gas, light	4
Medium	6
Heavy	8
Inside use	15

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INCOME TAX PRINCIPLES

The amount of income tax paid by a taxpayer depends on --

1. His income subject to tax, and
2. the amount of his taxable income.

The taxpayer can do little about the law but he can manage his business to regulate taxable income so that taxes will be kept at a minimum. Revenue agents are required by law to make sure that taxpayers do not pay less than they should. It is the business of the taxpayer to see that he does not pay too much.

Making a complete and accurate tax return at the close of the year is not enough. All you can do then is put down what has happened. Tax savings can usually be affected only at the time of completing the daily transactions. To avoid unnecessary taxes, constant study and planning are needed throughout the year.

ACCOUNTS

Accurate, detailed accounts are needed:

1. To make a correct tax return.
2. To protect against overpayment.

The law does not require that overpayment accounts be kept, but in the absence of records or clear supporting evidence, will not allow doubtful items. For a simple small-farm operation, a day-to-day record of cash income, expenses, and other financial transactions may prove adequate. The completeness of the record is far more important than the form.

Larger businesses, particularly where purchases, sales, and other operations are many and varied, should keep a complete set of double entry books. [Double entry books are account books where you list all cash items (income or expense) in one column or book. Then in another column or book you show what it was for. The two columns must always add up to the same total.] Bills, invoices, receipts, cancelled checks, and other supporting evidence should be filed and held with record books for three to five years. You'll need them if a recheck is made by the Internal Revenue Dept.

CASH BASIS

The easiest way of filing an income tax return is on the "Cash Basis" or "Cash receipts and disbursements basis". All income actually received and all expenditures actually paid out within the year are reported regardless of the year to which they apply. Thus, if crops are stored or livestock fed so as to produce abnormally large incomes in any one year, such income will be taxed in the year received. With surtax rates high and rising, this can result in paying excess taxes over a period of years.

→ The cash basis should be used by farmers only when the business is small and/or the net income about the same each year.

ACCRUAL BASIS

The Accrual Basis of filing income tax returns, reports income as earned and expenses as incurred, regardless of when received or paid. The same records are required as for the Cash Basis plus, (1) accounts payable, (2) accounts receivable, (3) complete inventories of all farm property. A complete set of double entry books is best but for most farms these need not be elaborate or complicated.

→ The Accrual Basis should be used by farmers whose operations are large or complicated; also where periodic purchases and marketings may be large. This includes farms where livestock is a major enterprise and where crops may be stored for sale beyond January 1 of the following year.

INVENTORY

Taking a complete inventory at the close of each year is a good business practice. When filing income tax returns on a cash basis an inventory of buildings, fences, machinery and tools is needed to calculate the amount of depreciation. On the Accrual Basis, the complete inventory of farm property must include all livestock, grain, hay, and other farm products, and supplies.

The common methods of inventory valuation are (1) "Cost", and (2) "Cost or Market whichever is lower". The latter method is well adapted to farm use.

A classified schedule should be set up including all depreciable property by individual items. This should show (1) the date of acquisition, (2) cost, and (3) rate of depreciation. This list should be continued year after year by adding newly acquired items and cropping items disposed of or scrapped.

FARM VALUES

Usually the purchase price of a farm should be divided between --

1. Land and
2. Improvements (a) Dwelling house, (b) Other farm buildings, (c) Fences, and (d) Other improvements such as drains.

Depreciation cannot be claimed on the land or the farm dwelling if used by the owner as his residence. Depreciation can be claimed on improvements (including the dwelling if not used by the farm owner as his residence).

(NOTE) -- You must use the same methods of reporting your income tax year after year unless you get permission to change. March 31 is the deadline for making application to the Tax Commissioner for permission to make a change in method of reporting.

INCOME TAX

Estimated Useful Lives And Depreciation Rates

Selected Sections From Bulletin "F"

U.S. Treasury Department -- Bureau Of Internal Revenue

LUMBER AND WOOD PRODUCTS

	Years
Logging machinery and equipment	10–15
Sawmill machinery and equipment	20–25
Portable sawmills and equipment	10–12

OFFICE EQUIPMENT *Average useful life (years)*

A composite life of about 15 years has been found applicable to office equipment. Where the equipment is segregated into groups, the following lives are recognized:

	Years
Safes	50
Furniture, fixtures, and filing cases	20
Mechanical equipment	8

Item lives are given in the following list:

Adding machines	10
Addressing and mailing machines	15
Billing machines	8
Binders, loose-leaf	20
Blue-printing machines	15
Bookkeeping machines	8
Cabinets and files	15
Calculators	10
Call system and annunciators	14
Cases:	
Book	20
Display	20
Chairs:	
Bentwood	5
Heavy	16
Check perforators	10
Check writers	8
Cleaners, electric vacuum	6
Clocks:	
Time	15
Time-stamping	10
Wall	20
Coolers, water	10
Desks	20
Dictation machines	6
Duplicating machines	10
Fans, electric	10
Folding and sealing machines	10
Helmets, rescue	6
Hospital equipment	15
Lamps, desk and floor	10
Linoleum	8
Lockers	25
Lunch-room equipment	15
Mirrors	20
Money machines	10
Numbering machines	10
Photographing machines	16
Pneumatic-tube systems	20
Racks and stands	15
Rugs, carpets, and mats	10
Safes and vaults	50
Scales, counter and mail	10
Settees	13
Shades, window	10
Signs, board	10
Tables	15
Typewriter	5
Wardrobes	20

BUILDING EQUIPMENT *Average useful life (years)*

Heaters, electric	10
Heaters, gas	15
Heating systems:	
Boilers and furnaces	20
Burner equipment—	
Gas	16
Oil	10
Radiators	25
Lighting systems:	
Conduits and fittings.[1]	
Wiring	20
Fixtures	15
Miscellaneous facilities:	
Awnings	5
Doors, louvre, ventilating	15
Incinerators	14
Safes and vaults.[1]	
Screens, window	10
Shades	5
Venetian blinds	8
Plumbing:	
Faucets and flushing valves	15
Bath tubs, lavatories, toilet bowls, etc	25
Pipes—	
Brass or copper.[1]	
Iron, cold-water	25
Iron, hot-water or steam	20
Sewer, cast-iron or vitrified.[1]	
Valves—	
Brass body, water or steam.[1]	
Iron body, water or steam	20
Pumps:	
Suction, pressure and sump	13
Roofs:	
Asbestos	25
Asphalt and tar (prepared)	15
Galvanized iron—	
Light or cold dipped	15
Heavy or hot dipped	20
Tar and gravel (5-ply)	20
Tarred felt	10
Copper.[1]	
Slate.[1]	
Tile.[1]	
Tin.[1]	
Starters, electric	20
Switchboards, electric	25
Tanks and vats, water:	
Metal	25
Wood	15
Telephone equipment:	
Conduits and fitting.[1]	
Wiring and fixtures	20
Tools, small, miscellaneous	5
Transformers	25
Trucks, conveyance (within building)	10
Trucks, lift	15
Voltmeters	15
Welfare equipment:	
Athletic	10
Cafeteria	10
Hospital and first aid	10
Police and fire	10
Wells and well pumps	25

[1] Life of building.

CANNED PRODUCTS

Average lives from 15 to 17 years are considered reasonable for the machinery of canneries engaged in canning fruits and vegetables.

MOTOR AND OTHER VEHICLES

Motor vehicles included in this classification are those used by commercial enterprises other than public utility and construction. Lives considered reasonable are indicated below:

Automobiles:	*Years*
Passenger	5
Salesman	3
Horse-drawn vehicles	8
Motorcycles	4
Tractors	6
Trailers	6

Trucks:	*Years*
Outside use—	
Electric	10
Gas, light	4
Medium	6
Heavy	8
Inside use	15

DEPRECIABLE PROPERTY ACQUIRED BY BEQUEST, DEVISE, OR INHERITANCE

If depreciable property was acquired by bequest, devise, or inheritance, or by the decedent's estate from the decedent, the basis for computing depreciation in respect of such property shall be the fair market value of the property at the time of such acquisition.

TREATMENT IN CASES OF CERTAIN PARTICULAR CLASSES OF PROPERTY

REAL ESTATE IN GENERAL

Depreciation and obsolescence deductions covering real estate must be confined to the improvements. For the purpose of the income tax law, land itself is not subject to depreciation. Improved property is often purchased as a whole without segregating the cost of the building from the cost of the land. In such cases the value of the building must be determined through appraisal, by reference to assessed values, or in some other recognized manner. In no case will an apportionment be accepted that does not allocate a reasonable part of the cost to the land.

Buildings not occupied.—A taxpayer engaged in the business of repairing and building houses, and holding them for sale or rent is entitled to a deduction for depreciation in respect thereof though they are vacant while a tenant or purchaser is being sought.

Rented property.—The owner of real property rented for residential purposes is entitled to deductions for depreciation of the property even though the operation of such property is not his principal trade or business. He must in any event include in gross income the entire amount received as rentals.

Personal residence.—If a taxpayer uses a portion of his residence for business purposes, as in the case of a physician or any other professional man who has his office in his home, a proportionate part of the depreciation sustained may be deducted, the proportion to be based generally on the ratio of the number of rooms in the building. The same principle is applicable if a taxpayer rents a portion of his personal residence to other individuals.

MISCELLANEOUS CLASSES OF PROPERTY

Depreciation deductions by farmers in general.—A reasonable allowance for depreciation may be claimed on farm buildings (other than a dwelling occupied by the owner), farm machinery, and other physical property. A reasonable allowance for depreciation may also be claimed on livestock purchased for draft, dairy, or breeding purposes, unless they are included in an inventory, used to determine profits. If such livestock is included in an inventory, no depreciation thereon will be allowed, as any reduction in value will be reflected in the inventory. The depreciation should be based on the cost or other basis and the estimated useful life of the property.

Orchards.—The life of an orchard may be somewhat indefinite, but it can be determined as accurately as the probable life of other tangible property, such as a building, upon which depreciation charges are allowed. In any event, it is certain that there is a gradual and ultimate exhaustion of an orchard within a number of years after the productive stage has been reached. All expenditures necessary to bring orchard trees to a producing stage may be capitalized and, thereafter a fair and reasonable annual allowance for depreciation may be deducted in order to return to the owner free of income taxation the capital invested, just as in the case of an investment in other tangible property used in any other business or trade. The basis for computing the depreciation is the cost or other allowable basis of the trees at the time the orchard has reached an income-producing stage, including initial cost or other basis and capitalized expenditures incurred in bringing them to maturity, and the rate of depreciation is to be determined by the average productive life under normal conditions of the trees after the income-producing state is reached.

Automobiles.—A deduction may be claimed for depreciation of automobiles and similar equipment in use in a trade or business. A professional man, a physician, for example, who uses an automobile in making professional calls, is entitled to an allowance for depreciation in respect thereof, but if the automobile is used partly for pleasure or purposes apart from the business, only a proportionate part of the depreciation sustained thereon may be deducted. Where an automobile is used solely for pleasure, no depreciation deduction is allowable in respect thereof. Where an automobile is used by an individual as a transportation facility from the home to the place of business, no depreciation may be allowed by reason of such use.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

INCOME TAX PRINCIPLES

The amount of income tax paid by a taxpayer depends on --

1. His income subject to tax, and
2. the amount of his taxable income.

The taxpayer can do little about the law but he can manage his business to regulate taxable income so that taxes will be kept at a minimum. Revenue agents are required by law to make sure that taxpayers do not pay less than they should. It is the business of the taxpayer to see that he does not pay too much.

Making a complete and accurate tax return at the close of the year is not enough. All you can do then is put down what has happened. Tax savings can usually be affected only at the time of completing the daily transactions. To avoid unnecessary taxes, constant study and planning are needed throughout the year.

ACCOUNTS

Accurate, detailed accounts are needed:

1. To make a correct tax return.
2. To protect against overpayment.

The law does not require that overpayment accounts be kept, but in the absence of records or clear supporting evidence, will not allow doubtful items. For a simple small-farm operation, a day-to-day record of cash income, expenses, and other financial transactions may prove adequate. The completeness of the record is far more important than the form.

Larger businesses, particularly where purchases, sales, and other operations are many and varied, should keep a complete set of double entry books. [Double entry books are account books where you list all cash items (income or expense) in one column or book. Then in another column or book you show what it was for. The two columns must always add up to the same total.] Bills, invoices, receipts, cancelled checks, and other supporting evidence should be filed and held with record books for three to five years. You'll need them if a recheck is made by the Internal Revenue Dept.

CASH BASIS

The easiest way of filing an income tax return is on the "Cash Basis" or "Cash receipts and disbursements basis". All income actually received and all expenditures actually paid out within the year are reported regardless of the year to which they apply. Thus, if crops are stored or livestock fed so as to produce abnormally large incomes in any one year, such income will be taxed in the year received. With surtax rates high and rising, this can result in paying excess taxes over a period of years.

→ The cash basis should be used by farmers only when the business is small and/or the net income about the same each year.

ACCRUAL BASIS

The Accrual Basis of filing income tax returns, reports income as earned and expenses as incurred, regardless of when received or paid. The same records are required as for the Cash Basis plus, (1) accounts payable, (2) accounts receivable, (3) complete inventories of all farm property. A complete set of double entry books is best but for most farms these need not be elaborate or complicated.

→ The Accrual Basis should be used by farmers whose operations are large or complicated; also where periodic purchases and marketings may be large. This includes farms where livestock is a major enterprise and where crops may be stored for sale beyond January 1 of the following year.

INVENTORY

Taking a complete inventory at the close of each year is a good business practice. When filing income tax returns on a cash basis an inventory of buildings, fences, machinery and tools is needed to calculate the amount of depreciation. On the Accrual Basis, the complete inventory of farm property must include all livestock, grain, hay, and other farm products, and supplies.

The common methods of inventory valuation are (1) "Cost", and (2) "Cost or Market whichever is lower". The latter method is well adapted to farm use.

A classified schedule should be set up including all depreciable property by individual items. This should show (1) the date of acquisition, (2) cost, and (3) rate of depreciation. This list should be continued year after year by adding newly acquired items and cropping items disposed of or scrapped.

FARM VALUES

Usually the purchase price of a farm should be divided between --

1. Land and
2. Improvements (a) Dwelling house, (b) Other farm buildings, (c) Fences, and (d) Other improvements such as drains.

Depreciation cannot be claimed on the land or the farm dwelling if used by the owner as his residence. Depreciation can be claimed on improvements (including the dwelling if not used by the farm owner as his residence).

(NOTE) -- You must use the same methods of reporting your income tax year after year unless you get permission to change. March 31 is the deadline for making application to the Tax Commissioner for permission to make a change in method of reporting.

INCOME TAX ESTIMATED USEFUL LIVES AND DEPRECIATION RATES

U. S. Treasury Department - Bureau of Internal Revenue

Selected Sections from BULLETIN "F"

MOTOR AND OTHER VEHICLES

Motor vehicles included in this classification are those used by commercial enterprises other than public utility and construction. Lives considered reasonable are indicated below:

	Years
Automobiles:	
Passenger	5
Salesman	3
Horse-drawn vehicles	8
Motorcycles	4
Tractors	6
Trailers	6

	Years
Trucks:	
Outside use—	
Electric	10
Gas, light	4
Medium	6
Heavy	8
Inside use	15

OFFICE EQUIPMENT *Average useful life (years)*

A composite life of about 15 years has been found applicable to office equipment. Where the equipment is segregated into groups, the following lives are recognized:

	Years
Safes	50
Furniture, fixtures, and filing cases	20
Mechanical equipment	8

Item lives are given in the following list:

Adding machines	10
Addressing and mailing machines	15
Billing machines	8
Binders, loose-leaf	20
Blue-printing machines	15
Bookkeeping machines	8
Cabinets and files	15
Calculators	10
Call system and annunciators	14
Cases:	
Book	20
Display	20
Chairs:	
Bentwood	5
Heavy	16
Check perforators	10
Check writers	8
Cleaners, electric vacuum	6
Clocks:	
Time	15
Time-stamping	10
Wall	20
Coolers, water	10
Desks	20
Dictation machines	6

Duplicating machines	10
Fans, electric	10
Folding and sealing machines	10
Helmets, rescue	6
Hospital equipment	15
Lamps, desk and floor	10
Linoleum	8
Lockers	25
Lunch-room equipment	15
Mirrors	20
Money machines	10
Numbering machines	10
Photographing machines	16
Pneumatic-tube systems	20
Racks and stands	15
Rugs, carpets, and mats	10
Safes and vaults	50
Scales, counter and mail	10
Settees	13
Shades, window	10
Signs, board	10
Tables	15
Typewriter	5
Wardrobes	20

BUILDING EQUIPMENT *Average useful life (years)*

Heaters, electric	10
Heaters, gas	15
Heating systems:	
Boilers and furnaces	20
Burner equipment—	
Gas	16
Oil	10
Radiators	25
Lighting systems:	
Conduits and fittings.[1]	
Wiring	20
Fixtures	15
Miscellaneous facilities:	
Awnings	5
Doors, louvre, ventilating	15
Incinerators	14
Safes and vaults.[1]	
Screens, window	10
Shades	5
Venetian blinds	8
Plumbing:	
Faucets and flushing valves	15
Bath tubs, lavatories, toilet bowls, etc	25
Pipes—	
Brass or copper.[1]	
Iron, cold-water	25
Iron, hot-water or steam	20
Sewer, cast-iron or vitrified.[1]	
Valves—	
Brass body, water or steam.[1]	
Iron body, water or steam	20
Pumps:	
Suction, pressure and sump	13

Roofs:	
Asbestos	25
Asphalt and tar (prepared)	15
Galvanized iron—	
Light or cold dipped	15
Heavy or hot dipped	20
Tar and gravel (5-ply)	20
Tarred felt	10
Copper.[1]	
Slate.[1]	
Tile.[1]	
Tin.[1]	
Starters, electric	20
Switchboards, electric	25
Tanks and vats, water:	
Metal	25
Wood	15
Telephone equipment:	
Conduits and fitting.[1]	
Wiring and fixtures	20
Tools, small, miscellaneous	5
Transformers	25
Trucks, conveyance (within building)	10
Trucks, lift	15
Voltmeters	15
Welfare equipment:	
Athletic	10
Cafeteria	10
Hospital and first aid	10
Police and fire	10
Wells and well pumps	25

[1] Life of building.

HOTELS *Average useful life (years)*

The average life of the furniture, fixtures, and equipment used in this industry is considered to be approximately 12 years, while item lives are recognized as follows:

Blankets and spreads	6
Carpets and rugs	6
Conditioning systems, air	15
Curtains, draperies, and scarfs	12
Decorations, sundry	5
Fire-alarm and fire-prevention equipment	20
Fixtures, light (portable)	8
Furniture:	
Dining room	12
Guest room	12

Furniture—Continued.	
Lobby	8
Hospital and first-aid equipment	10
House-cleaning equipment	10
Kitchen equipment	10
Laundry equipment	15
Refrigeration systems	11
Shades and screens	10
Silver polishing and plating equipment	10
Springs, mattresses, and pillows	9

LUMBER AND WOOD PRODUCTS

	Years
Logging machinery and equipment	10–15
Sawmill machinery and equipment	20–25
Portable sawmills and equipment	10–12

PUBLIC UTILITIES

Public utilities are regulated by some public agency which provides for more or less uniform rules of accounting. Practically all utilities use composite or group lives in determining depreciation allowances. The lives indicated below are considered reasonable.

WATER SUPPLY

(Average life of typical plant and system about 67 years)

	Average useful life (years)
Impounding dams	150
Springs and wells	100
Infiltration galleries and tunnels	100
Collecting conduits and reservoirs	75
Mains, cast iron:	
4-inch and less	50
6-inch	65
8- to 10-inch	75
12-inch and over	100
Settling basins	50
Coagulating basins	50
Filters	50
Steam engines	30
Internal combustion engines (Diesel type)	25
Pumps	50
Stand pipes	50
Meters	30
Hydrants	50
General office equipment	19
General shop equipment	20
General store equipment	20
Laboratory equipment	16

CANNED PRODUCTS

Average lives from 15 to 17 years are considered reasonable for the machinery of canneries engaged in canning fruits and vegetables.

DEPRECIABLE PROPERTY ACQUIRED BY BEQUEST, DEVISE OR INHERITANCE

If depreciable property was acquired by bequest, devise or inheritance, or by the decedent's estate from the decedent, the basis for computing depreciation in respect of such property shall be the fair market value of the property at the time of such acquisition.

TREATMENT IN CASES OF CERTAIN PARTICULAR CLASSES OF PROPERTY

REAL ESTATE IN GENERAL

Depreciation and obsolescence deductions covering real estate must be confined to the improvements. For the purpose of the income tax law, land itself is not subject to depreciation. Improved property is often purchased as a whole without segregating the cost of the building from the cost of the land. In such cases the value of the building must be determined through appraisal, by reference to assessed values, or in some other recognized manner. In no case will an apportionment be accepted that does not allocate a reasonable part of the cost to the land.

Buildings not occupied.—A taxpayer engaged in the business of repairing and building houses, and holding them for sale or rent is entitled to a deduction for depreciation in respect thereof though they are vacant while a tenant or purchaser is being sought.

Rented property.—The owner of real property rented for residential purposes is entitled to deductions for depreciation of the property even though the operation of such property is not his principal trade or business. He must in any event include in gross income the entire amount received as rentals.

Personal residence.—If a taxpayer uses a portion of his residence for business purposes, as in the case of a physician or any other professional man who has his office in his home, a proportionate part of the depreciation sustained may be deducted, the proportion to be based generally on the ratio of the number of rooms in the building. The same principle is applicable if a taxpayer rents a portion of his personal residence to other individuals.

MISCELLANEOUS CLASSES OF PROPERTY

Depreciation deductions by farmers in general.—A reasonable allowance for depreciation may be claimed on farm buildings (other than a dwelling occupied by the owner), farm machinery, and other physical property. A reasonable allowance for depreciation may also be claimed on livestock purchased for draft, dairy, or breeding purposes, unless they are included in an inventory, used to determine profits. If such livestock is included in an inventory, no depreciation thereon will be allowed, as any reduction in value will be reflected in the inventory. The depreciation should be based on the cost or other basis and the estimated useful life of the property.

Orchards.—The life of an orchard may be somewhat indefinite, but it can be determined as accurately as the probable life of other tangible property, such as a building, upon which depreciation charges are allowed. In any event, it is certain that there is a gradual and ultimate exhaustion of an orchard within a number of years after the productive stage has been reached. All expenditures necessary to bring orchard trees to a producing stage may be capitalized and, thereafter a fair and reasonable annual allowance for depreciation may be deducted in order to return to the owner free of income taxation the capital invested, just as in the case of an investment in other tangible property used in any other business or trade. The basis for computing the depreciation is the cost or other allowable basis of the trees at the time the orchard has reached an income-producing stage, including initial cost or other basis and capitalized expenditures incurred in bringing them to maturity, and the rate of depreciation is to be determined by the average productive life under normal conditions of the trees after the income-producing state is reached.

Automobiles.—A deduction may be claimed for depreciation of automobiles and similar equipment in use in a trade or business. A professional man, a physician, for example, who uses an automobile in making professional calls, is entitled to an allowance for depreciation in respect thereof, but if the automobile is used partly for pleasure or purposes apart from the business, only a proportionate part of the depreciation sustained thereon may be deducted. Where an automobile is used solely for pleasure, no depreciation deduction is allowable in respect thereof. Where an automobile is used by an individual as a transportation facility from the home to the place of business, no depreciation may be allowed by reason of such use.

INCOME TAX PRINCIPLES

The amount of income tax paid by a taxpayer is the result of -

1. The tax law, and
2. The items subject to tax

The taxpayer can do little about item (1), the law; but can so regulate his business as to control taxable items (2) in a way to keep taxes to a minimum. The minimum tax is the just one to pay. The Government by law and by careful recheck by paid experts sees that the taxpayer does not pay less than he should but does nothing about preventing the taxpayer from paying too much. It is the business of the one who must pay taxes to see that he does not pay too much.

The income tax rates of the 1942 Federal Revenue Act are from 24% (including the victory tax) to 90%. To pay the huge national debt and the current costs of government and governmental programs, will require even higher income taxes. It is, therefore, increasingly important that taxpayers study the plan of operating their business as well as all individual business transactions to determine the procedure that will save the most taxes.

It is not enough to merely make out a complete and accurate tax return at the close of the year. That is only the recording of transactions already completed. Tax savings can usually be affected only at the time of completing the daily transactions. This control over the items taxed and the avoidance of unnecessary taxes can, therefore, be accomplished only by constant study and guidance throughout the year.

The 1942 law requires single persons with a gross income of $500 and married persons with gross incomes of $1200 or more per year to file returns. This means that most farmers will now be required to file Federal Income Tax returns.

ACCOUNTS -

An accurate and detailed set of accounts is necessary
(a) For making a correct income tax return, and
(b) As protection against overpayment.

The law does not require that accounts be kept but in the absence of books or clear supporting evidence, will not allow doubtful items.

For a small simple farm operation a day-to-day record of cash income and expenses and other financial transactions may prove adequate. The completeness of the record is far more important than the form. For a larger business, particularly where there are many and varied purchases, sales, and other operations, a complete set of double entry accounts should be kept.

In every case all bills, invoices, receipts, cancelled checks, and other supporting evidence should be carefully filed and held for three to five years so they can be produced if a recheck is made by the Internal Revenue Department.

CASH BASIS -

The most simple method of filing an income tax return is on the "Cash Basis" or "Cash receipts and disbursements basis." It reports all income actually received and all expenditures actually paid out within the year regardless of the year to which they apply. Thus if crops are stored or livestock fed so as to produce abnormally large incomes in any one year, such income will be taxed in the year received. With the high surtaxes now in use and which are certain to be continued, this can easily result in paying excess taxes over a period of years.

The cash basis should be used for farms only when the business is very small and/or the income and expenses regular from year to year.

ACCRUAL BASIS -

The Accrual Basis of filing income tax returns should be used on farms where operations are large or complicated or where there may be large periodic purchases and marketings. This includes farms where livestock, particularly livestock feeding, is a major enterprise and where crops may be stored for sale in future years.

The Accrual Basis is the method most certain to avoid the payment of excess taxes, and keep the payment of income taxes on the most reasonable basis from year to year.

The Accrual Basis reports income as of the time it is earned and expenses as of the time they are incurred, regardless of the time that either may be actually paid. This requires the same records as for the Cash Basis plus, (1) accounts payable, (2) accounts receivable, and (3) complete inventories of all farm property. A complete set of double entry books is best but for most farms these need not be elaborate or complicated.

It is important to start on the right basis as a change requires the permission of the Commissioner and may result in excess taxes for the year in which the change is made.

INVENTORY -

The taking of a complete inventory at the close of each year is a good business practice. In addition, for the Cash Basis of filing income tax returns an inventory of buildings, fences, machinery and tools is needed to calculate the amount of depreciation. For the Accrual Basis a complete inventory of all farm property must be had including all livestock, grain, hay, and other farm products and supplies.

The common methods of valuation are (1) "Cost", and (2) "Cost or Market whichever is lower." The latter method is best adapted to farm use. When one method has been adopted it cannot be changed in future years without the consent of the Commissioner.

Market valuations should be used for items on which the cost is not easily established. In using the market quotation the expense of selling such as delivery and commission charges should be deducted.

A classified schedule should be set up including all depreciable property by individual items. This should show (1) the date of acquisition, (2) cost and (3) rate of depreciation. This list should be continued year after year by adding newly acquired items and dropping items disposed of or scrapped. A column for each year permits a rapid check record.

FARM VALUES -

Farm values, usually the purchase price, should be divided between

1. Land; and
2. (a) Dwelling house, (b) Other farm buildings, (c) Fences, and (d) Other improvements such as drains.

Depreciation cannot be claimed on the land or the farm dwelling if used by the owner as a house, but depreciation can be claimed on improvements (including the dwelling if not used by the farm owner as his residence). In the allotment of value it is normally an advantage to allow full value on the improvements so as to get an adequate depreciation allowance.

GENERAL -

Get started right - The methods put into use at the start must be followed from year to year unless the tax Commissioner gives permission to change.

Seek competent advice - if necessary employ the help needed. Taxes saved by using the help of accountants and counsel who know the income tax laws as applied to farms can easily amount to many times the cost of such help.

Questionable items should be explained in detail in the tax return, attaching whatever additional memoranda as are necessary.

Unusual or obscure items should be clearly described to save expense and annoyance.

Avoid round figures - use exact dollars and cents. If estimates are necessary show how calculated, as "Repairing fences, 12 days labor at $2.50 - $30.00" rather than - "Repairs $30.00".

Fill in all schedules and items. Write the word "none" where no figures are to be entered.

Keep complete records day by day throughout the year starting with an inventory. Close with an inventory if on an Accrual Basis.

Complete the tax return promptly after January 1st. If difficulty is encountered time will thus be available to get the needed information.

Remember, you can do little about the tax law but it is up to you to handle your business, your books, and your tax return so that your tax will be the minimum required under the law.

INCOME TAX--FARM CHECK LIST

These check lists and accompanying notes are too brief to show clearly the Income Tax Law and its method of administration in every case. The lists are primarily to enable picking up items for the income tax returns that might otherwise be overlooked.

Under both income and expenses are many items that must under some circumstances be excluded. Usually the nature of the transaction creating the income or expense indicated how the items should be handled.

These check lists include items that should be entered directly in the regular tax form as well as in the Farm form.

These lists are detailed enough to illustrate the numerous items that need to be accounted for - - but they are not all inclusive. Different types of farming will have both income and expense items peculiar to the type of operation involved. An effort has been made to make these lists sufficiently illustrative to show the kinds of entries to be included regardless of the farm enterprise.

When In Doubt - seek competent advice. If necessary, employ the help needed. Taxes and trouble saved by using the help of accountants and counsel who know the income tax law as applied to farms can easily amount to many times the cost of such help.

INCOME

Include all items of income from sources such as the following. Include all items sold or exchanged for, groceries or merchandise.

Livestock and Poultry
- Horses
- Mules
- All Cattle
- Hogs
- Sheep
- Chickens
- Turkeys
- Ducks
- Geese

Game Animals

Fur Bearing Animals, Furs

Livestock, Dairy & Poultry Products
- Wool
- Mohair
- Hides
- Meat
- Sausage
- Milk and Cream
- Butter
- Cheese
- Skim Milk
- Eggs

Breeding Fees

Bees, Honey

Sorghum

Maple Sugar

Farm Crops Sold
- Corn
- Wheat
- Oats
- Barley
- Rye
- Soybeans
- Cowpeas
- Sorghums
- Flax
- Cotton
- Cottonseed
- Tobacco
- Rice
- Sugar Beets
- Hay
- Straw
- Potatoes
- Specialty Crops

Seeds, Sold
- Legumes
- Grasses
- Grain Crops
- Vegetables

Truck Crops, sold
- Vegetables

Fruits and Nuts Sold
- Apples
- Peaches
- Pears
- Small fruits
- Walnuts
- Pecans
- Filberts

Forest Products, sold*
- Logs
- Lumber
- Standing Timber
- Posts
- Firewood

Natural Resources*
- Gravel
- Sand
- Gas
- Coal

Natural Resources (continued)
- Oil
- Stone
- Water

Machine Rental

Custom Work

Tractor Hire

Team Hire

Wages Earned

Work Off Farm

Living quarters furnished by employer.

Christmas bonuses

Mineral lease

Races Winnings

Fair Premiums and Awards

Contest Prizes

Awards for Excellence

Winnings, games of chance

Gambling profits

Gain on Illegal Transactions

Racing Stable

Hobby

Rents
- Land
- Buildings
- Storage

Interest
- Loans
- Bonds
- Accounts

Dividends
- Stocks
- Cooperative

Government Payments
- A.A.A.
- S.C.S.
- Storage

Insurance Collected*
- Fire
- Wind
- Hail
- Lightning
- Automobile
- Truck
- Livestock
- Bad debts previously deducted

Capital Sales*
- Land
- Buildings
- Implements
- Breeding Herds**
- Workstock**

Inventory increase (accrual basis)

Advance payments received

Accrued income not actually received

Accounts Receivable*
- Money Due
- Notes Covering Sales

Cancelled debts may be income

Items traded for
- Groceries
- Merchandise
- Labor
- Equipment
- Anything of Value

Annuities

Tax refunds, other than on income taxes paid

Jury fees

Options not exercised

Alimony received

Produce or products used by the family

NON-TAXABLE income that must be shown on attached statement.
- Recovery from injury or sickness
- Personal law suits
  - Slander and liable
  - Loss of Life
  - Breach of Promise

DO NOT INCLUDE such items as:
- Life insurance collected
- Gifts
- Inheritances
- Repayable advances
- Accrued interest not yet collectable
- Personal insurance proceeds
- Personal injury damages
- Property the result of --
  - Gifts
  - Inheritance
- Principal of loans collected

NOTE - Many of the income items herein listed are frequently cleared through depreciation accounts or direct in the income tax returns without being included in the farm schedule but all must be accounted for and reported.

* Requires special treatment - get advice

** See Page 480

INVENTORY (See Digest page 484)

"Farm Price" if used is the market price less cost of disposing of the item, such as trucking, shrinkage, commission, etc.

Growing crops cannot be included in the inventory.

DEPRECIATION

Capital expenditures are not deductible but they can be depreciated from year to year to reflect the gradual reduction in value resulting from exhaustion, obsolescence, wear and tear.

It is not always necessary to follow the depreciation rates published by the Internal Revenue Department. The actual experience of a farmer is usually accepted. If the taxpayer shows sound judgement in figuring the rate of depreciation and obsolescence, the examining agents are instructed to accept same. However, once a depreciation rate has been set for a building or farm implement it is not advisable to change the rate.

Related items may be grouped and carried at an average rate of depreciation.

Certain intangibles may be set up as capital and as such depreciate from year to year. Examples are; some patents, copyrights, licenses, and leaseholds.

DEPENDENTS

Dependents are persons who receive more than half of their support from the taxpayer (unless they earn more than $500 per year.) They must be related but may or may not be living with the taxpayer.

Any person receiving more than $500 income per year ceases to be a dependent and must report income separately. It is not necessary to report the income of dependents earning less than $500 per year.

GENERAL

Maintain an income tax file into which to drop memos from time to time that should be considered when the time comes for filing the tax returns. These records should include incidental costs and contributions that may not clear through the regular accounts.

Keep a record of small incidental items. Taxes such as on telephone bills, tickets, etc. will total surprisingly large in many cases.

HOBBY FARMS

Many farms are operated at a loss year after year. Unless the owner can prove that his INTENT is to farm for profits and not for pleasure he runs the risk of having his farm classified as a "hobby farm" and not subject to income tax deductions. Hiring a commercial farm manager, consulting with an agricultural expert, eliminating special recreational features and setting up accounts to separate farm expenses from personal expenses have all been used to prove that the intent of the owner was to produce profits.

INCOME TAX - FARM CHECK LIST

EXPENSES

Include all expenses and costs whether paid in cash or with produce or other farm products. Obligations incurred during the tax year are included if returns are made on the accrual basis.

Livestock and Poultry Purchased
Horses Chickens
Mules Turkeys
Cattle Ducks, Geese
Hogs Baby Chicks
Sheep Eggs for hatching
Fur Bearing Animals
Game Animals

Livestock, Dairy & Poultry Misc.
Registration Fees Dip
Shearing Expense Veterinary
Breeding Fees Disinfectants
Dairy Supplies Medicine
Breed Magazines Fly Spray
Poultry Supplies Vaccines
Hire of Livestock Testing
Fair or Show Expenses
Dues to breed or livestock ass'n
Feed and Bedding Purchased
Farm Grains Straw
Commercial Feeds Silage
Hay Sawdust
Minerals Tonics Salt
Seed Purchased
Field Crops Legume
Vegetable Crop Grasses
Plants and Tree Stock (produce to be sold)
Fruit Ornamental Forest
Vegetables Commercial Flowers
Fruit
Soil Treatment
Fertilizer Rock phosphate
Manure Lime
Drainage
Ditches Tile Repairs
Machinery and Equipment (Depreciation Items) - All Farm Equipment
Tractors Tanks
Truck Portable Buildings
Automobile Brooders
Electric fences
Materials, used in products
Tools
Small tools Small Equipment tools
Machinery Repairs
Repair parts Machine shop
Garage
Blacksmith Work
Tool sharpening Horse shoeing
Harness Repairs
Power Expenses
Oil Truck license
Electricity(farm) Gasoline
Auto license Anti-Freeze
Harvesting Expenses
Threshing Silo Filling
Baling Seed treatment
Shelling Baling wire
Combining Twine
Custom Work, Machine Hire
Tractor, or Team Hire
Labor
Wages paid Bonus
Food purchased for labor
Pensions to retired help
Payment to pension trust
Uniforms or clothing supplies for employees
Donations to labor for services
Christmas gifts to employees
Feed Grinding
Insect and Disease Control Costs
Spraying
Fuel
Heat (not home) Brooders
Tank heaters Engine

Food
Purchased for labor also cost of growing and preparing food for labor
Cost of growing food used in home
Entertainment - Business
Rent
Paid in cash
Expense of raising crops given as rent.
Building Repairs (not home)
Barns Cribs
Sheds Colony houses
Fence
New construction (may be capital investment) Repairs
Storage
Crops Elevator Equipment
Insurance (not home or personal)
Crop Machinery & Equipment
Livestock Liability, Farm
Fire Liability, Automobile
Theft & truck-(farm share)
Collision
Health (amount in excess of 5% of adjusted gross income)
Doctor, Dentist, Medicine
Hospital, Nurse
Health, Accident Ins, Premium
Taxes (state and local only)
Grain Real Estate
Truck Automobile
Licenses Gasoline, Oil
Livestock State Income
Tickets
Show, Concert
Fair Sports
Railroad Bus, Boat
Airplane Parties, Dances
Purchases, (Sales Tax)
Dues, fees Telegrams
Telephone Radio Messages
Tobacco Safe Deposit Box
Reading matter Revenue stamps

If a record of taxes on purchases has not been kept, estimates can be made. If reasonable they will usually be allowed. Example: if the state sales tax is 2%, estimate the sum spent for taxable items and take 2% as the tax. Admission taxes at 10% can be calculated in the same way. If no detailed record is available, estimate gasoline and oil tax.

Interest
Mortgages Notes
Carrying charges Accounts
Installment purchases
Fees and Services
Farm Management Appraisals
Bookkeeping Auditing
Membership in Farm Organization
Lawyer
Commissions
Freight
Express
Trucking
Postage
Telephone
Telephone tolls
Electricity
Water bill
Account books
Books & Magazines on farm subjects
Office supplies
Typewriters Stationery Printing
Advertising
Travel, Business

Bad Debt Losses
Theft Losses
Fire, Flood, Storm Losses not Compensated by Insurance
Farm Business Losses for Previous Years, under some Conditions
Inventory Decrease (accrual basis)
Alimony paid
Union Dues

CONTRIBUTIONS

CONTRIBUTIONS, FEES, ETC.
Religious Charitable
Gifts Community Chests
Pew Rent Red Cross
Dues Unemployment
Scientific Orphan Homes
Research Old Peoples homes
Economic Soc. Social service
Scientific Societies Fraternal orders for charity
Literary and Educational
Schools Future farmers
Scouts Voters Leagues
4-H Clubs Study Clubs
D.A.R. Musical Clubs
Conservation Organizations
U. S., State, County, City or Town
Roads Fire
Police Schools
Humane Society
Am. Legion & Women Auxiliaries

If contributions are other than cash, deduct the fair market value. Contributions may be made as --
Food baskets Toys
Magazines Books
Food, clothing, etc. for bazaars
Picnics for organizations

Do not include Gifts or donations to such as the following:
Social Clubs Athletic Clubs
Social Fraternization
Propaganda organizations
Prohibition societies
Political committees
Needy relatives or friends

Amounts in excess of 15% of adjusted gross income will not be allowed.

NOT DEDUCTIBLE
Gifts Allowance to wife
Betting losses
Attorney fees for personal work
Payments for illegal purposes
Lodge and personal dues
Losses on farms operated as a "hobby" or for pleasure and recreation
Life insurance premiums
Insurance on home and personal and household effects
Accidental payments
Personal living or family expenses
Cost of maintaining the residence or home
Auto, part that is personal
Value of crops paid as rent, deduct only expense of growing
Vacation and personal travel
Loans paid off (Principal)
Loss on prospective crops
Federal income taxes*, estate, inheritance, legacy, succession and gift taxes
Value of family labor
Proceeds of loans
Inheritance received.

NOTE - Many of the items herein listed are frequently cleared through depreciation accounts or direct in the income tax returns without being included in the farm schedule but all should be accounted for and reported.

Include only the farm share of such items as insurance, expense of automobile, electricity, telephone. Prorate according to percentage of personal and farm use.

* Sometimes deductible in State Income Tax Returns

Personal expenses are never deductible. An exception is the law regarding health costs that exceed 5 per cent of adjusted gross income.

All ordinary and necessary business expenses are deductible.

A deduction must not be taken twice - if interest or taxes are deducted as a farm expense, it cannot be deducted again in another part of the return.

INCOME TAX -- FARM CHECK LIST

Include All Income *in your tax return except that which is specifically exempt. This includes income which is offset by expenses. Types of income which must be reported are wages; salaries, bonuses; commissions; tips and gratuities; dividends; interest from bonds, loans, certain types of pensions, annuities, endowments; rents and royalties from property; patents, copyrights; profits from business, farm or profession; partnership profits; contest prizes; gambling winnings; and profits from sale of property.*

CHECK LIST OF FARM INCOME

These check lists do not include all forms of income or expense which must be included in th tax return. They do list the major sources of income and items of expense encountered by farmers. The grouping will help you decide if an item not listed should be included.

The sale of any of the items listed below constitutes farm income. Some farmers will have other sources of farm income that do not appear on this list.

* Livestock

Feeder pigs
Boars
Fat hogs
Sows
Gilts
Feeder cattle
Fat cattle
Veal calves
Heifers
Cows
Bulls
Lambs
Ewes
Rams
Goats
Horses
Mules
Hens
Broilers
Frying chickens
Turkeys
Ducks
Geese
Bees

Livestock Products

Milk
Cream
Butter
Buttermilk
Cheese
Eggs
Dressed poultry
Dressed meat
Wool
Lard
Hides
Honey

* Woodland Products

Standing trees
Logs
Posts
Poles
Ties
Fuel wood
Chemical wood
Pulp wood
Mine props
Christmas trees

Crops

Cotton
Field Corn
Popcorn
Sweet corn
Soybeans
Wheat
Oats
Rye
Barley
Sorghum
Grass seed
Clover seed
Lespedeza seed
Alfalfa seed
Tomatoes
Potatoes
Tobacco
Pumpkins
Melons
Peanuts
Beans
Cabbage
Sweet potatoes
Peppers
Apples
Peaches
Cherries
Pears
Berries
Maple sirup
Cider

Miscellaneous

Custom work
Machine rental
Breeding fees
Rent received in crop shares
Interest on cropper accounts
Cash rent
Agricultural program payments
Insurance rec'd on loss of growing crops
Sales of gravel
Refunds (of items claimed as expenses)
Patronage refunds

* Under certain conditions some of these items may be treated as the sale of capital assets.

Income Which Should Not be reported would be life insurance proceeds upon death; gifts, inheritances, bequests; workmen's compensation insurance; damages for bodily injury or sickness; Railroad Retirement Act benefits; dividends on veteran's government insurance; Federal and State social security benefits; interest on state and municipal bonds and certain Federal bonds issued before March 1 1941; most government payments made to veterans and their families.

"Adjusted Gross Income". is the major figure used in determining tax liability. To the farmer or businessman this figure can be ambiguous. It does not mean the total of all the receipts of the business. Adjusted gross income is income remaining after the following deductions.

→ All expenses directly incurred in operating a trade, business or farm.

→ Deductions of expenses incurred in holding property for production of rents or royalties.

→ Expense of travel, meals, and lodging incurred by an employee while away from home in the service of his employer.

→ Other reimbursed expenses in connection with employment.

→ Deductions for depreciation and depletion allowable to a life tenant, or to an income beneficiary of property held in trust.

→ Allowable losses from sale or exchange of property

The other group of deductions consists of allowable non-business expenses. These expenses have no relation to general business or farming activities. These non-business expenses are deducted from adjusted gross income. What's left is net income.

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FARM CHECK LIST -- EXPENSES

In general you may deduct from gross receipts all expenditures directly connected with the farm business except those which represent capital investments. These must generally be recovered through depreciation.

Many of the expenditures are partly business and partly personal. Deduct only that part which has to do with your farm business.

CHECK LIST OF FARM EXPENSES

Labor Hired
Day labor
Season and yr. labor
Piecework
Cash board

Feed Bought
Grain
Other concentrates
Beet pulp
Feed mixing hired
Hay
Other roughage

Seeds & Plants Bought
Corn
Oats
Rye
Wheat
Other grains
Legumes
Grass
*Vegetables
Seed mixtures
Seed treatment
Plants & vines bought
Other seeds

Machine Work Hired
Tractor
Silo filling
Hay baling
Ginning
Airplane dusting, combining, etc.
Other machine work

Supplies Bought
Strainer discs
Washing powders
Leg bands
*Stamps and stationery
*Light bulbs & fuses

Tying Material
Wire
Rope
Twine
Rubber bands

Containers
Bags
Boxes
Egg cases
Other types

Insect & Disease Control
Sprays
Dusts
Other materials

Machinery Repairs
Machine-shop work
Repair parts
Blacksmith work
Service calls

Farm Bldg. Repairs
Roofing
Painting
Plumbing
Wiring
Cement
Lumber
Glazing
Nails, screws, bolts

Livestock Fees
Breeding
Registration, transfer
Cow testing
Exhibition
Sheep shearing

Fertilizer Bought
Mixed fertilizer
Phosphate
Potash
Nitrogen
Lime
Manure
Trace Minerals

Veterinary
Services
Equipment
Dips
Disinfectants
Fly control
Medicines
Vaccines
Poultry flock treatment
Dehorning

***Fuel, Light, Power**
Gasoline
Fuel oil
Oil and grease
Coal
Electricity

***Taxes**
Real estate
Other farm property
Auto & truck use tax

Trucking Hired
Hauling crops
Hauling livestock
Hauling milk
*Other hauling
*Freight & express
*Parcel post

Insurance Premiums
*Farm buildings
Livestock
Crops
Accident & liability

Interest Paid
Notes
Chattel mortgages
Real estate mortgage

Rent, Cash
Pasture
Cropland
Buildings

***Auto & Truck**
Gas and oil
Antifreeze
Repairs
Tires
Operator's license
Insurance

Poultry Bought
Chicks and poults
Other poultry
Hatching eggs
Custom hatching

Miscellaneous
Commissions
Advertising
Storage
Farm papers
Bedding & litter
Small tools & equip.
Fencing materials
Telephone
Farm organization dues
Farm business travel

* Particular care should be used with these items to make sure personal expenses are not included.

Contributions to religious charitable, scientific and educational institutions can be deducted from gross income (total income minus business expenses). Contributions over 20 per cent of gross income cannot be deducted. If contributions are other than cash, deduct the fair market value.

EXPENSES NOT DEDUCTIBLE

Gifts
Allowance to wife
Betting losses
Attorney fees for personal work
Illegal payments
Lodge dues
Losses on farm operated as a "hobby"
Life insurance premiums
Insurance on home and personal and household effects
Personal living expenses
Cost of maintaining the residence or home
Personal auto use
Value of crops paid as rent, deduct only expense of growing
Vacation
Loans paid off (Prin.)
Loss on prospective crops
Federal income taxes, estate, inheritance, and gift taxes
Value of family labor

SOCIAL SECURITY

HOW THE NEW LAW AFFECTS FARMERS

Beginning January 1, 1951, regular farm workers and domestic help in the farm home will be covered by the new Social Security Law. Self-employed farmers are not included at present. They may expect to be covered within 10 years if the trend toward social legislation continues.

Farm Workers include all those who --

- Work in planting, cultivating, or harvesting of any farm crop.
- Work with livestock, poultry, bees or fur-bearing animals on a farm.
- Work in preparing, non-commercial processing or delivering of crops or livestock to storage or to market.
- Work or cook in the farm household.
- Do work of a general nature on a farm.

Workers engaged in ginning cotton or turpentine production are not included.

Workers Are Eligible for social security credit after they have worked full time for a qualifying quarter -- any of the three-month calendar periods ending March 31, June 30, September 30 or December 31 -- and received cash wages of at least $50 during the quarter. Steady employment for the final quarter of 1950 will qualify them.

To get continuous social security credit after having qualified, farm employees must work for the same employer at least 60 days and earn $50 in each succeeding calendar quarter. If employers are changed, workers must again work full time for another qualifying quarter before their work begins to count for social security. No taxes are paid during the qualifying quarter.

Wages paid to children employed by their parents do not count until they reach 21 years of age. Neither do wages paid by a husband to his wife, by a wife to her husband, or by sons and daughters to their parents. A worker who owns a substantial investment in the farm business other than his personal car is not included.

If the farm is operated mainly as a residence or for pleasure, then household workers are not considered as farm help, but as domestic workers. The new Social Security Law covers domestic workers if they work only 24 days in a quarter and earn $50 cash wages.

Only cash wages to farm and domestic workers are taxed. Room, board, a house, farm products, firewood or any compensation other than cash are not included. A bonus paid in cash is considered as wages, and must be taxed if the worker is covered by social security.

In order to receive social security protection, workers must have accumulated sufficient "quarters of coverage" to become insured. A quarter of coverage means a calendar quarter in which the individual was paid wages of $50 or more for covered employment or netted $100 or more during a quarter of covered self-employment.

Social security provides those who are "fully" insured with protection for their survivors and old-age payments when they reach 65. Those who are only "currently insured" have their survivors protected, but are not eligible for old-age payments. The new law does not include unemployment insurance for farm workers.

WHEN IS A WORKER PROTECTED?

A worker is "fully insured" if (1) he has at least 40 quarters coverage, or (2) has to his credit at least half as many quarters of coverage as there are calendar quarters between January 1, 1951 (or the date he reaches 21 if that is later) and the time he becomes 65 or dies, but in no case less than six quarters of coverage. The quarters of coverage he may have received before 1951 count. To be "currently insured", the worker must have had at least six quarters of coverage during the 3 years immediately before he died. They do not have to be consecutive quarters.

Veterans who served in the armed forces during the period beginning September, 1940 and ending July, 1947 will be credited with wages of $160 for each month of active service. These credits will be included when the average monthly wages are figured. Veterans will receive these credits regardless of the type of employment before they entered the service. But they will not receive credits if their military service has qualified them for a government pension (other than from the Veterans' Administration). At present only veterans of World War II get quarterly credits.

YOUR RETURNS FROM SOCIAL SECURITY

Old-Age Payments -- When a fully insured individual reaches age 65 he is eligible for monthly retirement payments, but must file an application for them. His wife may also receive a monthly payment when she reaches 65 or if she is caring for a child under 18. Unmarried children of the wage earner may receive payments if they are under 18. If a married woman is both fully and currently insured her dependent husband can receive monthly payments when he reaches 65.

A retired worker under 75 and his beneficiaries are not entitled to monthly payments in any month that he earns more than $50 wages in employment covered by social security, or if he nets an average of more than $50 per month from covered self-employment. Income from annuities, dividends or interest are not included. All workers over 75 will receive all of their payments regardless of the amount of their wages or net earning from self-employment.

Survivor's Insurance -- When a fully insured individual dies, his children (stepchildren and adopted children included) under 18 may receive monthly benefits, and his widow may receive monthly benefits if she is caring for his children under 18. Her benefits will continue until the youngest child is 18. If she is not 65 at that time her benefits will stop, but she will again be eligible for benefits when she reaches 65. If the worker leaves no children or spouse and if his parents were dependent on him when he died, they may receive monthly benefits at age 65.

(Continued on Back)

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SOCIAL SECURITY FOR FARMERS

If the wage earner was currently but not fully insured when he died, monthly payments may be made to his children under 18 and to his widow while caring for the children. However, in currently insured cases the widow or dependent parent is not eligible for benefits at age 65.

A lump-sum is payable to the widow or widower upon the death of every insured wage earner after August, 1950. If there is no widow or widower, the person who paid the burial expense will be the recipient.

→ No social security payments can be made until a claim is filed. You don't have to be in want to receive social security payments, but you must apply for them -- they never start automatically. If a worker dies, his family should notify the social security office and ask about their payments. This is important, because the law permits monthly payments to go back no more than 6 months from the date on which the claim was filed. The lump-sum can be paid only if a claim is filed within 2 years after the worker dies.

Monthly Payments will depend on the average monthly wage of the worker. The average wage will be figured by taking the total wages paid during covered employment, and dividing by the months that have elapsed since the worker was eligible for Social Security. Payment will be computed by taking 50 per cent of the first $100 of the average monthly wage plus 15 per cent of the next $200. The wife's benefit is equal to one-half of the husband's. A widow or parent's benefit is equal to three-fourths of the husband's benefit. The benefit of the first child in a survivor family is three-fourths of the wage earner's benefit amount; other children each receive one-half.

MONTHLY PAYMENTS -- BASED ON NEW FORMULA

Average Monthly Wage	Retired Worker Alone	Retired Worker and Wife	Widow at Age 65	Widow and - 2 Children Under 18
Under $ 30	$20	$ 30.00	$15.00	$ 40.00 *
50	25	37.50	18.75	40.00
100	50	75.00	37.50	80.00
200	65	97.50	48.80	130.20
300	80	120.00	60.00	150.00 **

** Minimum and ** Maximum Monthly Payments.*

The above sample payments are based on the formula set up under the new social security amendments approved August, 1950. They do not apply until a worker accumulates six quarters of coverage after 1950 -- in no case before July 1, 1952. If a worker or his survivors are eligible for payments before this date, the social security office will use the old formula for figuring payments.

SOCIAL SECURITY AND YOU

If you are the FARM EMPLOYER -- you must register and get an identification number by filing Form SS-4 with the Collector of Internal Revenue or the Social Security field office. You must keep a written record of days worked by each employee, and file a quarterly return (Form No. 941 -- the collector of Internal Revenue will send you a copy at the end of each calendar quarter) showing the name and social security number of each employee and the total wage paid each one. With this you must include payment of 3 per cent (1-1/2 per cent from his salary, 1-1/2 per cent from you) of all cash wages paid to each worker that has qualified. This is due within the month following the quarter. For the January-March quarter, it is due on or before April 30. After you have filed Form SS-4 with the Collector of Internal Revenue, you will receive a rate table that shows the amount of tax to be paid on different wage amounts.

You must also give the employee a written statement that shows his and your name, the period covered, the total taxable wages paid within the period and the employee's social security tax on such wages. It will be easiest to give these statements to the employees at the time you file your quarterly return. However, you also have the choice of giving the employee his statement at the time his wages are paid, or once a year.

If you are the FARM WORKER -- you must show your social security card to your employer. He must have your exact name and social security number as shown on the card. If you do not have a social security number, apply for one before January, 1. Ask for application form SS-5 at the post office or local social security office. → If you've had a social security number before, but have lost it, indicate this on the form, otherwise you may lose the quarters credited against your first number.

Tax Rate -- Each party now pays 1-1/2 per cent of the worker's wages up to an annual wage of $3,600. On January 1, 1950, the rate was raised from one to 1-1/2 per cent and provisions are now in the law that will raise these rates so that each party pays:

3,600
.0225
18000
7200
7200
81.00

2 per cent beginning January 1, 1954
2-1/2 per cent beginning January 1, 1960
3 per cent beginning January 1, 1965
3-1/4 per cent beginning January 1, 1970.

However, Congressional action can change these dates and rates at any time.

Self Employed with net earnings of at least $400 a year will also be covered by social security starting January 1, 1951. (This does not include farm operators and certain professional self-employed.) The self-employed must (1) get a social security card; (2) file a return on their earnings at the same time the 1951 income tax report is filed (by March 15, 1952) and (3) pay the social security tax up to a maximum of $3,600 annual net earnings. The rate of self-employed is 1-1/2 times the regular rate for individuals. Accordingly the present rate schedule for self-employed is: -- 2.25 per cent until 1954, 3 per cent from 1954-59, 3.75 per cent from 1960-64, 4.5 per cent from 1965-69, and 4.875 per cent after 1969.

Plan For The Future, and do not overweigh the social security benefits. They should be figured as a supplement, not a substitute for life insurance or old age provisions. Further inflation -- which appears inevitable -- will considerably reduce the purchasing power of future benefit payments.

SOCIAL SECURITY IS RIGID AND HARD -- Unless the worker has fulfilled all the qualifications, neither he nor his family will be entitled to any payments. If in doubt about any of the details, check with your local Social Security Board before it is too late. All farmers hiring workers must comply, or be liable to a fine and imprisonment.

500 Farm Management

500 Farm Management

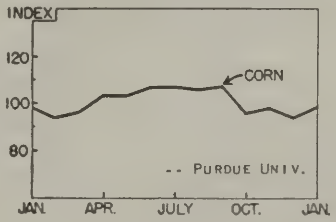
WHEN TO SELL AND BUY FARM CROPS

The best time to sell farm crops will depend upon storage costs and the expected price changes in the months following harvest. By knowing the normal price changes, you are in a position to plan ahead and buy and sell to a greater advantage.

Seasonal variation is the normal movement of prices during the year and occurs chiefly as a result of seasonal changes in supply and demand. An index of seasonal variation shows the relationship of prices in any one month to the average for the year.

However, each year will have somewhat different price movements depending upon crop size, government programs, trend in the general price level, and other modifying factors. These are discussed every month on pages 1 and 501.

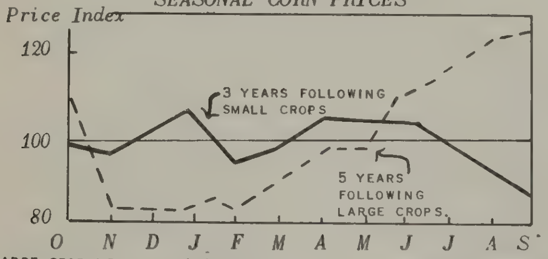
Corn Prices are usually lowest in November at the time of harvest and then rise gradually as the next harvest approaches. Variation in prices between harvest and the following August depends to a large degree on corn crop size.



Index numbers of prices received by Indiana farmers for corn, November, 1946 to October, 1950. Yearly average = 100

Generally it is profitable to store corn for longer periods in years of large crops; for shorter periods in years following a small crop. A small corn crop almost always shows a quicker price recovery after harvest than a large crop. Prices of the larger corn crop are lower at harvest than the medium sized and small crops.

SEASONAL CORN PRICES



LARGE CROP YEARS -- 1932, '35, '37, '46, '48
SMALL CROP YEARS -- 1934, '36, '47
SOURCE OF DATA-USDA

"In marketing years following very short crops of corn the peak in prices has come most frequently early in the marketing season, usually in December or January. The high prices and scarcity of feed so reduce the numbers of livestock, especially hogs, that the demand for corn declines later in the season.

"Also, two very short corn crops have never yet occurred in succession. In the summer after a short crop consumers look forward to larger supplies from the new crop and consequently economize in the use of corn. Hence in such years the price of corn has typically worked lower from the high level reached early in the season.

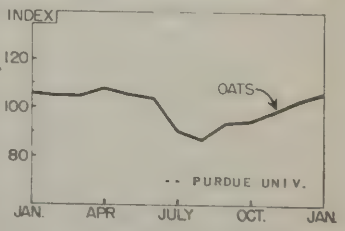
"When a large crop follows a very short crop, livestock numbers and consequently consumption of feed are usually below average at the start of the marketing year. Corn supplies therefore tend to be more than ample throughout the marketing year, and prices are likely to increase very little unless a crop scare develops in the following summer.

"When the number of hogs is greatly increased during a corn marketing season, the price of corn is likely to advance more than usual, for supplies rapidly decline as consumption increases.

"In periods when the general price level is rapidly rising or falling, the rise or fall may considerably influence the seasonal price pattern of corn. A pronounced rise in the general price level will tend to accentuate the seasonal rise in prices for corn and diminish the seasonal price decline, while a pronounced fall in the general price level will have the reverse effects". -- University of Illinois circular 516.

Seasonal price variation tends to be more pronounced in corn deficit areas than in corn surplus areas. Feeders will usually profit from buying needed corn early in the season in corn deficit areas, regardless of whether the crop is large or small.

Oats are fed mainly on the farms where raised. Prices fluctuate through the year along with the general price level, supplies, and the price of competing feeds. The seasonal price pattern is quite irregular. The trend is usually upward during November, December, and January and down in July and August. Prices follow the average seasonal movement more closely during the winter months than at other times of the year.



Index numbers of prices received by Indiana farmers for oats, November, 1946 to October, 1950. Yearly average = 100

Price increases seldom cover more than the costs of storage.

There is a tendency in oat deficit areas to have relatively higher prices shortly before

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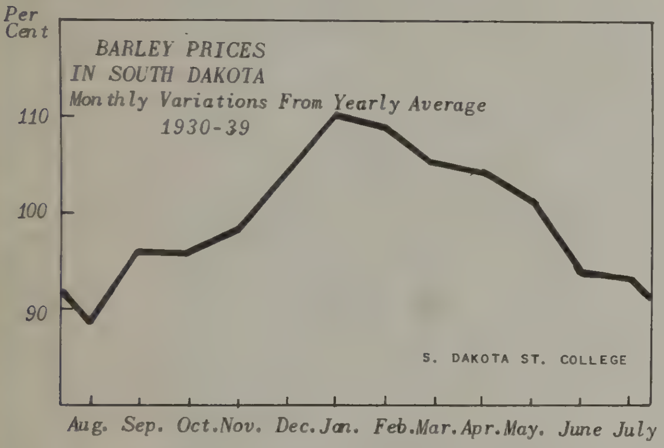
WHEN TO SELL AND BUY FARM CROPS

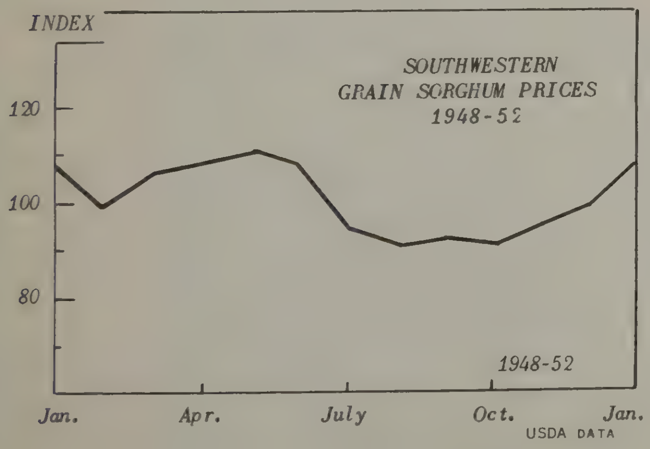
harvest than in surplus areas. This means that there is usually an added advantage for feeders to purchase needed oats immediately after harvest in deficit areas. Feeders in surplus areas may find it profitable to purchase oats as their needs develop.

Barley Prices show a seasonal pattern similar to oats. Highest prices occur in January and February and lowest in August.

"In 32 of the 50 years studied, there was sufficient rise in the barley market after the month of harvest so that farm storage would pay for itself, including a rental charge for the storage space provided...There has been too little consistency from year to year to permit formulation of any rule as to which month is the best to sell." -- South Dakota Experiment Station Bulletin No. 367.



Grain Sorghum Prices are usually highest in May, and lowest in October and November. Price is set mainly by the supplies and prices of other feed grains.

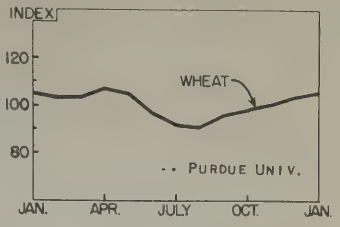


USDA DATA

Corn and grain sorghums are of practically the same feed value. Size of sorghum crop has a marked effect on local prices but size of national feed grain crop is also of great importance.

Wheat Prices average lowest in August and highest in May. Price usually moves up from late fall to mid-winter and then dips slightly from February to March. Considering long-time averages, the seasonal price rise in wheat is hardly great enough to cover cost of storage.

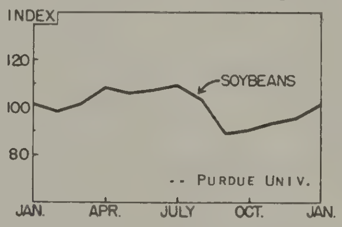
However, during long periods of rising farm prices or following the harvest of a large crop, it has been highly profitable for farmers to store an average of 6 months after harvest. High production of wheat usually brings a sharp price drop in August; a relatively stronger market the following spring.



Index numbers of prices received by Indiana farmers for wheat, November, 1946 to October, 1950.

Yearly average = 100

Soybean Prices have shown greater seasonal variation than any other grain crop. Over one-half of the crop is sold within a short harvest period in October and early November. After a sharp drop at harvest, prices rise irregularly, reaching a peak during the summer. This seasonal price rise for beans has been regular enough so that 80 per cent of the time it has been profitable to store. This situation may change as more farmers build storage for soybeans and more processors attempt to buy their full year's supply at harvest.

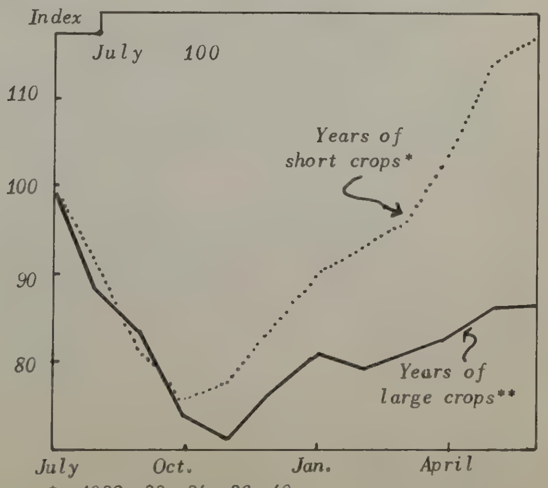


Index numbers of prices received by Indiana farmers for soybeans, November, 1946 to October, 1950.

Yearly average = 100

In years of short crops, prices start up soon after harvest and climb rapidly until the next summer. Prices recover much more than the drop at harvest. With a large crop, the price rise is slower and does not go back up to pre-harvest levels.

EFFECT OF SOYBEAN CROP ON SEASONAL PRICES, 1930-1940



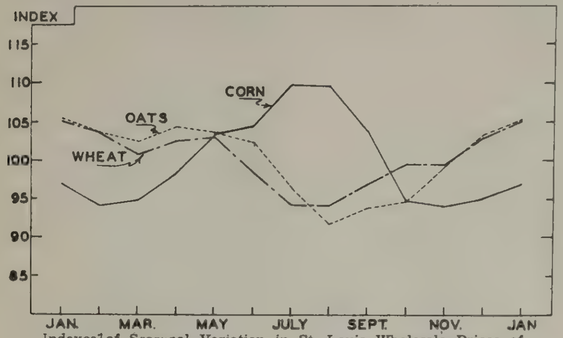
* 1932, 33, 34, 36, 40
** 1930, 41, 35, 39

--Purdue University

WHEN TO BUY AND SELL FEEDS

Grains

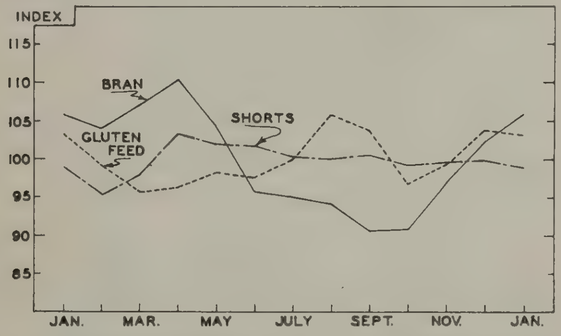
Judging from prices for the 16 years, 1924-39, corn prices commonly are lowest in November and highest in July. During the latter part of this period, however, these relationships were modified slightly by the corn loan program The rise from November to July was 15.7 per cent of the annual average.



Indexes[1] of Seasonal Variation in St. Louis Wholesale Prices of Corn, Oats and Wheat

Wheat prices were lowest in July and August and rose from then until January. Seasonal fluctuations in the price of wheat were relatively small, for the price of wheat normally rose only 11 per cent of the annual average from August to January.

Oats were cheapest in August during the 1924-39 period and from then until January, the general movement was upward. Oats prices averaged 13.7 per cent higher in January than in August in terms of the annual average of prices.



Indexes of Seasonal Variation in St. Louis Wholesale Prices of Bran, Shorts and Gluten Feed.

Grain By-Products

Seasonal movements in bran prices followed a different course from those for wheat. Prices of bran averaged highest in April and cheapest in September, but the decline from April to June was especially sharp, probably due to the substitution of pastures for bran in the feeding program. The seasonal change in bran prices of 19 per cent of the annual average was nearly twice that for wheat.

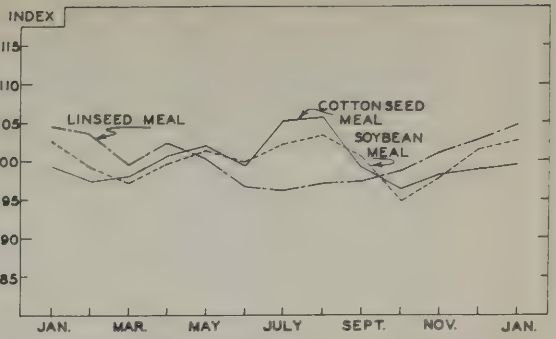
Seasonal fluctuations in prices of shorts were much less than those of wheat or bran. The change from the low in February to the high in April was only 8.4 per cent of the annual average.

Gluten feed prices showed little seasonal tendency The seasonal change amounted to only 10 per cent of the annual average price.

Oil Meals

Cottonseed meal prices were highest in August and lowest in October. The average difference in prices between these months was 9.3 per cent of the annual average.

From the data available, it was not possible to discover any dominant seasonal movement in prices of soybean meal,



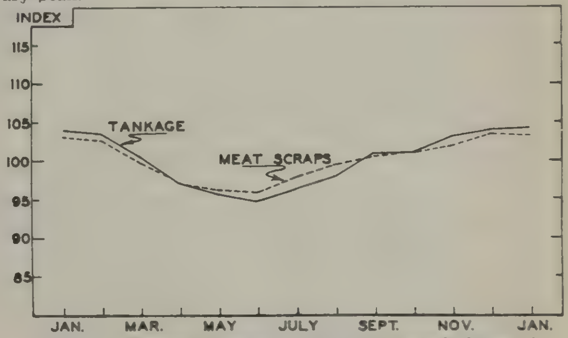
Indexes of Seasonal Variation in St. Louis Wholesale Prices of Linseed Meal, Cottonseed Meal and Soybean Meal.

Linseed meal prices were highest in January and lowest in July The change from July to December averaged 8.4 per cent of annual average prices.

Animal By-Products

Tankage could have been purchased cheapest in June in most years. The average difference between prices in June and January was 9.4 per cent of annual average prices or about the same as for cottonseed meal. The fact that the seasonal low in tankage prices occurs in summer rather than in winter when tankage production is higher apparently is due to the use of pastures and milk as substitutes for tankage in summer, thereby reducing the demand for tankage.

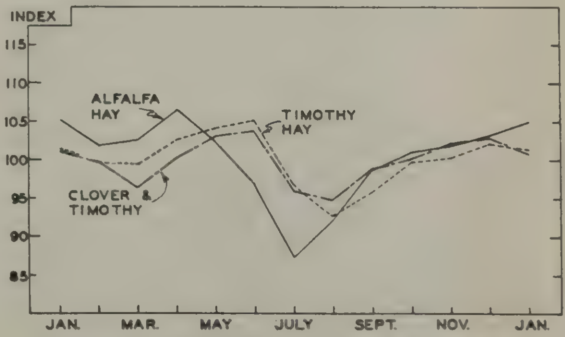
The seasonal variation in prices of meat scraps averaged only 7.3 per cent of annual averages from the June low to the January peak.



Indexes of Seasonal Variation in St. Louis Wholesale Prices of Tankage and Meat Scraps.

Hays

April was the peak month of alfalfa hay prices and July the low month. Prices moved down sharply from April to July The average difference between prices in April and July was 19.5 per cent of the yearly average price.



Indexes of Seasonal Variation in St. Louis Wholesale Prices of Clover and Timothy, Timothy, and Alfalfa Hays.

Timothy hay prices rose seasonally from August to June. During the two months from June to August, an average decline of 12.3 per cent of the yearly average occurred. The seasonal movement in prices of mixed clover and timothy hay was very similar to that for timothy hay,

MISSOURI AGRICULTURAL EXPERIMENT STATION
BULLETIN 422

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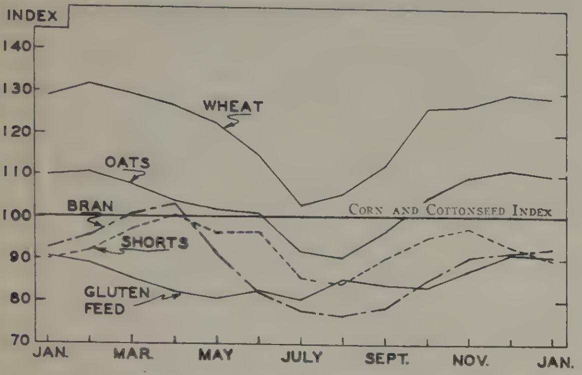
[1] An index of seasonal variation shows the normal relationship of prices in any one month or period to the average for the year. For example, the index of seasonal variation in corn prices for August was 109.6 which means that August corn prices normally are 9.6 per cent above the average for the year.

WHEN TO BUY AND SELL FEEDS

Indexes of economy for most feedstuffs showed certain definite seasonal movements. This indicated that there is a strong tendency for prices of certain feeds to be low in relation to feeding values during certain months of the year.

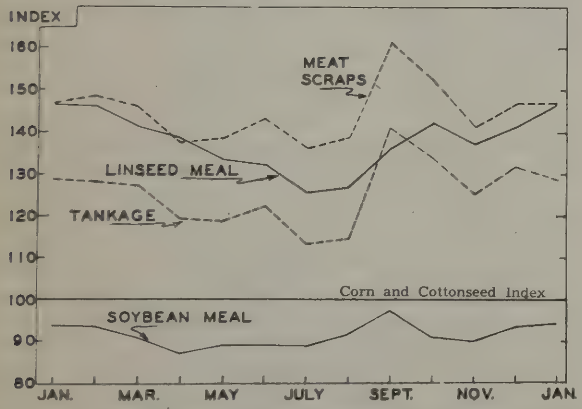
Grains and By-products.—Oats prices were cheapest relative to feeding values in August and highest in December. . . Indexes of economy for wheat were lowest in July and August but were more than 103 in each month.



—Seasonal Average Indexes of Economy of Wheat, Oats, Bran, Shorts and Gluten Feed.

Bran and shorts were cheap in relation to feeding values in nearly all months of the year but were cheapest in August. . . . In this month bran prices averaged 23 per cent less than feeding values and prices of shorts, 16 per cent less. Indexes of economy for both feeds were highest in April. Thus, both feeds were extremely economical just after wheat harvest but were less economical in the early spring months. Indexes of economy for gluten feed were lowest in July when they averaged 80.4 and highest in December, when their average was 91.2. . . . Thus, gluten feed normally was a relatively cheap source of nutrients in each month of the year.

Protein Supplements.—As a protein supplement, soybean meal compared very favorably in price with cottonseed meal, particularly in recent years. . . . During the 5 years, 1935-39, indexes of economy for this feed showed relatively little seasonal movement but were lowest in April and highest in September. The difference in indexes between these two months was only 10.2. Soybean meal prices averaged less than feeding values in each month. . . .



—Seasonal Average Indexes of Economy of Meat Scraps, Linseed Meal, Tankage and Soybean Meal.

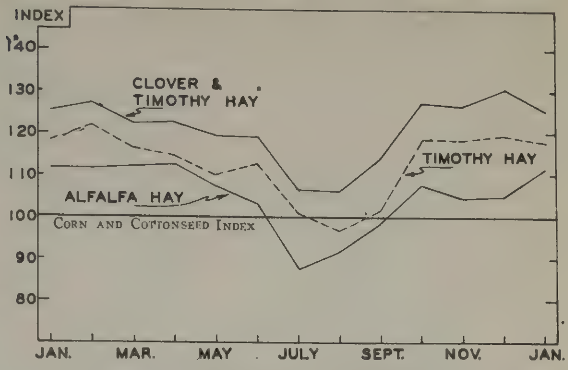
Average indexes of economy for linseed meal were lowest in July but prices at that time were nearly 26 per cent above feeding values. . . . In January, when linseed meal was most expensive, indexes averaged 146.5. Thus, linseed meal was a relatively expensive feed in all months of the year and could not compete satisfactorily from an economic standpoint with soybean and cottonseed meals as a source of nutrients.

Tankage prices averaged more than 10 per cent above feeding values in each month of the year . . . Its indexes of economy were lowest in July and August and were highest in September. Meat scraps also were relatively high-priced in each month of the year, for prices in July, when indexes of economy averaged lowest, were 36 per cent greater than feeding values.

Missouri Agricultural Experiment Station
Bulletin 422

Hays.—No. 1 alfalfa hay was most economical as a source of nutrients in July, whereas August was the low month for timothy hay and mixed clover and timothy hay. . . .

The hays were all relatively high priced from October until late spring.



—Seasonal Average Indexes of Economy of Clover and Timothy, Timothy, and Alfalfa Hays.

—Digestible Protein and Non-protein Digestible Nutrients, 14 Feeds*

Feed	Digestible Protein	Total Digestible Nutrients	Non-protein Digestible Nutrients
	(Pounds per 100 pounds of feed)		
Corn, No. 3 yellow	7.0	79.0	72.0
Wheat, No. 2 red winter	11.3	83.6	72.3
Oats, No. 3 white	9.4	71.5	62.1
Bran, standard	13.1	70.2	57.1
Shorts, gray	14.6	77.5	62.9
Gluten feed	22.7	77.4	54.7
Cottonseed meal, 41%	33.9	73.6	39.7
Soybean meal, 41%	34.8	80.5	45.7
Linseed meal, 37%	30.7	78.4	47.7
Digester tankage, 60%	56.4	78.0	21.6
Meat scraps, 50%	46.7	71.2	24.5
Alfalfa, No. 1	12.0	51.1	39.1
Mixed clover and timothy hay, No. 1	4.4	48.0	43.6
Timothy hay, No. 2	2.9	46.9	44.0

*Taken by special permission of the Morrison Publishing Company, Ithaca, New York, from **Feeds and Feeding**, 20th Edition, by F. B. Morrison.

CALCULATION OF INDEXES OF ECONOMY FOR FEEDS

The relative feeding value of different feeds as compared to the corn-cottonseed index can be determined at any time by following the steps outlined below:

(a) Determine the per-pound cost of digestible protein in the corn-cottonseed standard. This is done by multiplying the price of cottonseed meal per ton by .1664432, and subtracting from this the product received by multiplying the price of one bushel of corn times .03277685 .

(b) Determine the per-pound cost of digestible non-protein in the corn-cottonseed standard. This is done by multiplying the price of one bushel of corn by .0279882 and subtracting from this the product received by multiplying the price of cottonseed meal per ton by .01618197 .

(c) To determine the relative feeding value of any other feed, add the product received in multiplying the pounds of digestible protein in a unit of the new feed times the per-pound cost (as determined in "a") to the product received by multiplying the pound of digestible non-protein in a unit of the new feed times the per-pound cost (as determined in "b").

This system was perfected by W. E. Peterson, of the Division of Dairy Husbandry at the University of Minnesota. The Feed Buyer's Guide which appears on Digest page 517 was prepared in accordance with the Peterson system.

FEED BUYING GUIDES

Feed is the largest single cost of livestock and poultry production. Sizable savings can be made by knowing what time of the year each feed usually sells at its lowest price. This will help you decide when to shift from one grain, or protein supplement, to another.

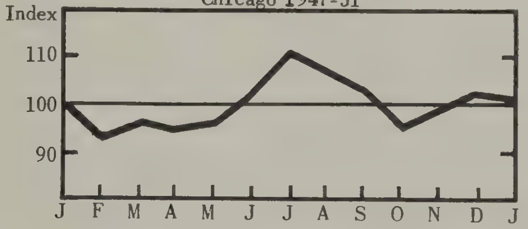
Feed prices move in the same direction as the wholesale price level but their movements are often more pronounced. Seasonal price variation in feeds is the result of changing supplies and demand.

WHEN TO BUY

Graphs showing the general month-to-month index of feed price changes are useful as a guide in longtime planning of feed purchases. But final buying decisions must be made after studying current market conditions. General price level changes, the Korean war, and price controls have created more unstable seasonal price patterns in recent years.

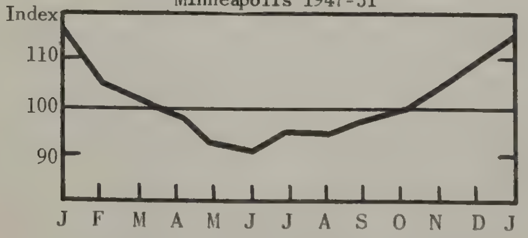
Soybean Meal prices are often highest in July and lowest in October and February. When rations are mixed on the farm, it may pay to substitute meat scrap and cereal protein for soybean and cottonseed meal in late summer.

SOYBEAN MEAL
Chicago 1947-51



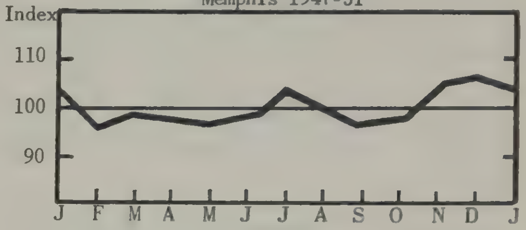
Linseed Meal --If buying protein in late summer, check linseed meal price. From 1947-51 it was at a low in early summer and didn't show much recovery until September. Cottonseed and soybean meal are nearer their seasonal price peak at this time. Linseed meal may be a cheaper source of protein.

LINSEED MEAL
Minneapolis 1947-51



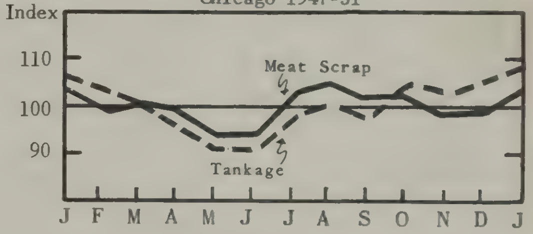
Cottonseed Meal -- In recent years seasonal prices have been less consistent, but they tend to reach a mid-summer and late fall peak. Purchases should be made before or after these periods. Other proteins may give more feed value for your money if bought at this time.

COTTONSEED MEAL
Memphis 1947-51



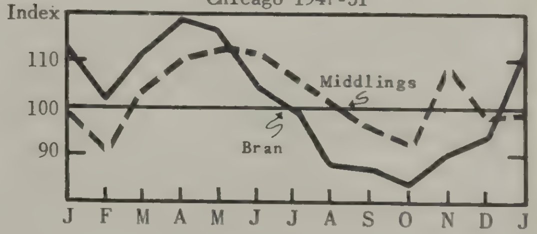
Meat Scrap -- Seasonal changes have been about the same in the past 20 years. These feeds are cheapest in the spring. The supply isn't largest then but the demand is weakest. Heavy demand for tankage and meat scrap make prices highest in the winter months.

MEAT SCRAP AND TANKAGE
Chicago 1947-51



Bran And Middlings are at their seasonal price low when other proteins may be expensive. They cannot be substituted entirely for the better quality protein feeds but may be used to supplement them if prices are out of line.

BRAN AND MIDDLINGS
Chicago 1947-51



MIXED FEED

Prices of mixed dairy rations and laying mashes change very little from month to month. Variations shown on the graph are not significant. Such feeds may just as well be bought as needed.

When grain prices are near their seasonal low it will pay you to cut down on the use of complete feeds and use more simple home-mixed dairy and poultry feeds.

Mixing hog supplements and special broiler rations has become a science. Scoop

SOURCE OF DATA FOR GRAPHS—USDA

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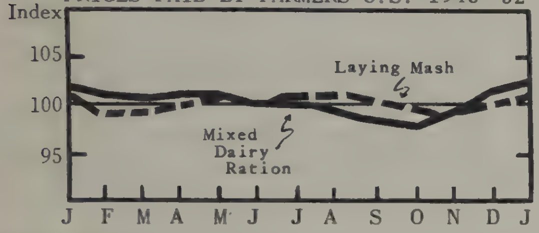
FEED BUYING GUIDES

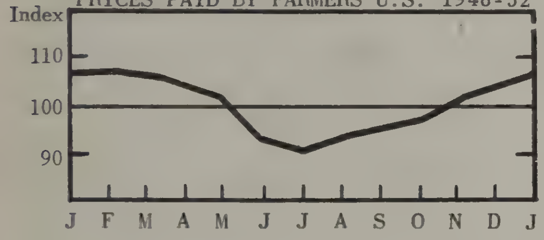
shovel home mixing of protein supplements on the farm is no longer practical with the modern "high pressure" formulas now being used. Mechanical mixers are needed to do a thorough job of evenly distributing minute amounts of minerals, vitamins, and antibiotics. In some areas custom mixing can be obtained so that you can get feed properly mixed to your own formula.

MIXED POULTRY AND DAIRY FEED
PRICES PAID BY FARMERS U.S. 1948–52



Alfalfa Hay prices are lowest in July -- highest from December through March. From 1948-'52, the average price rise was $4.09 per ton between July and February -- an average of 19 percent. Buy hay at harvest. Sell later in the fall or winter.

ALFALFA HAY
PRICES PAID BY FARMERS U.S. 1948-52



HOW TO BUY

Feed tags are your best guide to spending feed dollars wisely.

Tags vary from state to state. But all must list ingredients in the feed and give an analysis showing protein, fat and fiber content. When buying feeds compare the tags.

Check for:

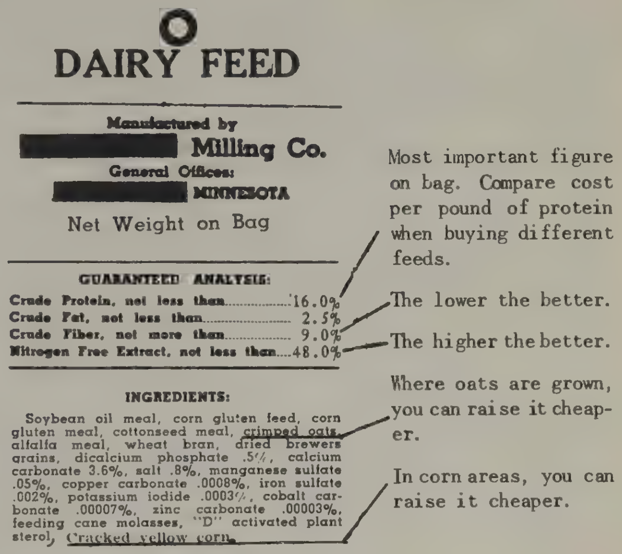
- ✓ protein content
- ✓ lower fiber
- ✓ amount and kind of ingredients

Protein Content is one of the measures of value for commercial feeds. It is checked regularly by state feed control officials. When checking feed prices, compare cost per pound of protein rather than cost per pound of feed.

Fiber is that part of the feed which animals cannot use to advantage. The higher the fiber content, the lower the feeding value.

Ingredients listed on the tag also indicate quality. Feeds containing ground grain screenings and oat mill feed may have a good analysis, but they lack the palatability of pure grain and oil-meal feeds. Of the cereal grain proteins, wheat, oats or barley products are superior to corn.

Closed Formula Feeds do not state the quantity of various ingredients. Higher priced ingredients may be small in comparison with the less expensive ones. Unfortunately, feed companies are not required to list the amount of each ingredient used.



DAIRY FEED

Manufactured by
[redacted] Milling Co.
General Offices:
[redacted] MINNESOTA

Net Weight on Bag

GUARANTEED ANALYSIS:

Crude Protein, not less than	16.0%
Crude Fat, not less than	2.5%
Crude Fiber, not more than	9.0%
Nitrogen Free Extract, not less than	48.0%

INGREDIENTS:

Soybean oil meal, corn gluten feed, corn gluten meal, cottonseed meal, crimped oats, alfalfa meal, wheat bran, dried brewers grains, dicalcium phosphate .5%, calcium carbonate 3.6%, salt .8%, manganese sulfate .05%, copper carbonate .0008%, iron sulfate .002%, potassium iodide .0003%, cobalt carbonate .00007%, zinc carbonate .00003%, feeding cane molasses, "D" activated plant sterol, Cracked yellow corn.

Most important figure on bag. Compare cost per pound of protein when buying different feeds.

The lower the better.

The higher the better.

Where oats are grown, you can raise it cheaper.

In corn areas, you can raise it cheaper.

Open Formula Feeds show the exact amount of each ingredient used. Many of the bigger cooperatives use these. It's a real help to the buyer. When you know the content you can better compare the cost of the purchased feed with the cost of making a similar mixture on the farm. Also, the amount of digestible protein and total digestible nutrients in the feed can be computed so the ration may be balanced.

Feeds Containing Drugs have the amount of drug, purpose of drug and how to use the drug stamped on the feed tag. Be especially careful with medicated feeds. Feed only as directed to the class of livestock or poultry for which they are intended.

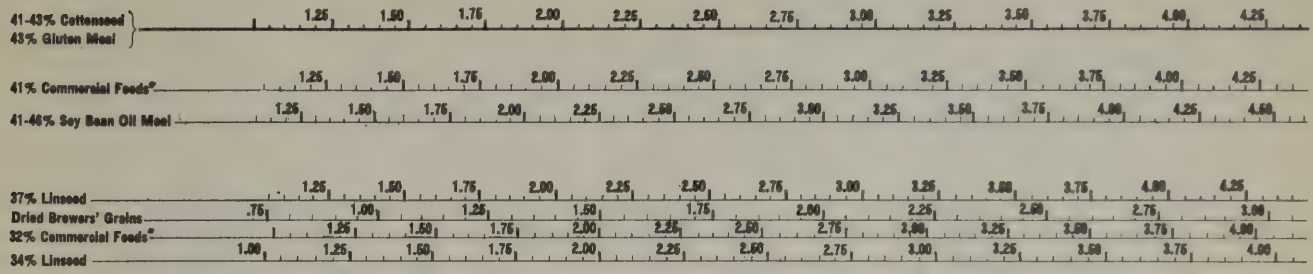
State Feed Testing Services are maintained by all states. A trained staff samples all feeds sold. Feeds are analyzed and checked against the claims of the manufacturer. If analysis shows that a feed does not meet its guarantee, the company is notified and corrective action taken. Consistent failure to meet guarantees can cost a feed company its right to sell feed in certain states.

The results of state feed analyses are published in yearly bulletins. These are free -- can usually be obtained through agricultural colleges or state departments of agriculture.

For Lowest Cost and greatest profits, use as much home-grown feed as possible. Nutrients supplied from pastures, hays, and home-grown grains cost the least. After maximum use has been made of such feeds, make up deficiencies with commercial protein, mineral and vitamin supplements.

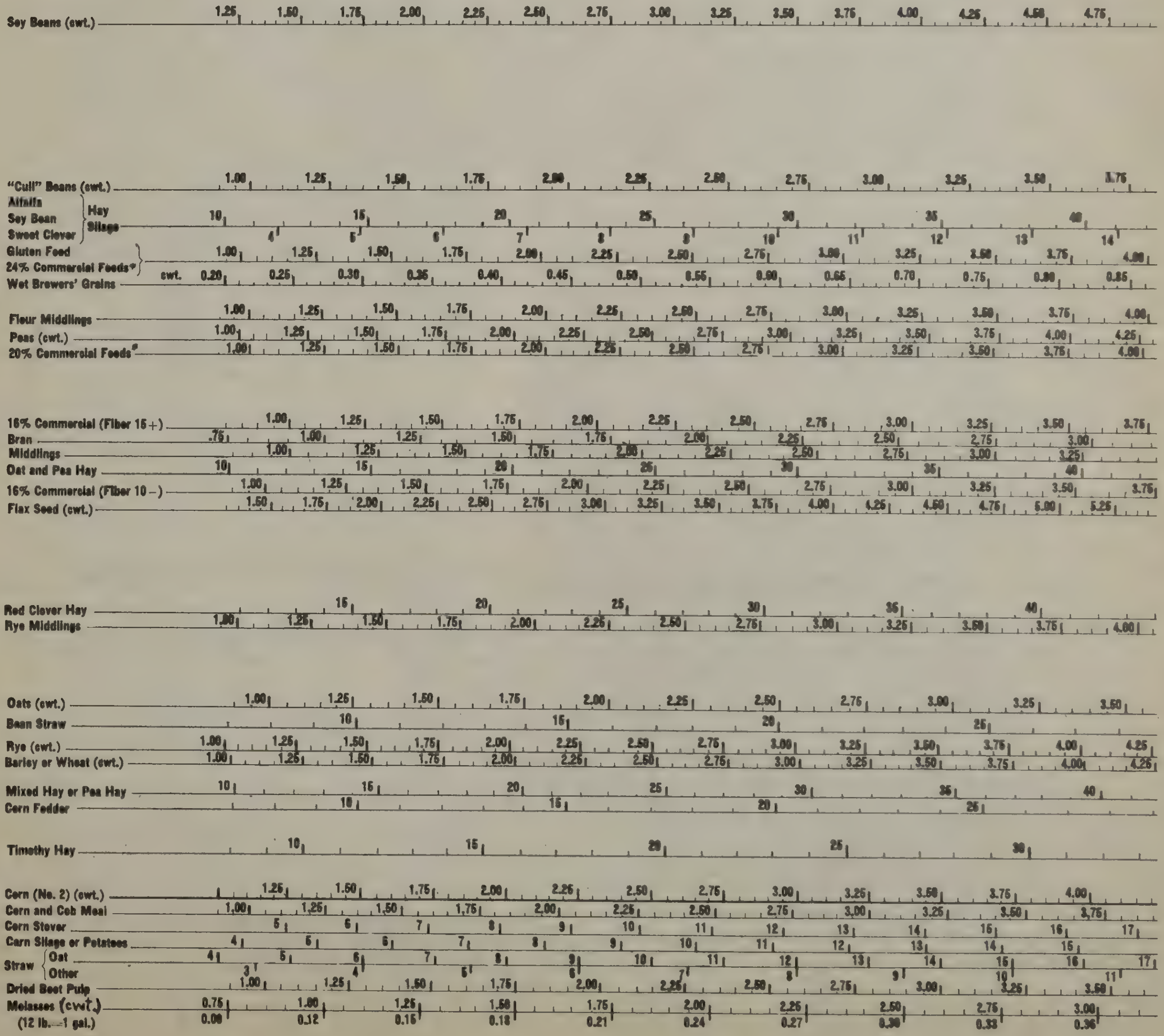
FEED BUYER'S GUIDE

Prices for roughages are by the ton; for all other feeds, by the hundredweight.



Directions: Considering local prices, select a high protein feed and a cereal feed that seem cheapest. Place a straight-edge so that it rests on these selected base feed prices. Comparative values of all feeds will be shown at points where straight-edge intersects lines for such feeds.

(See Other Side)



*Commercial Dairy Feeds

DOANE AGRICULTURAL DIGEST ® APR., 1950

(Printed in U.S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

MICHIGAN STATE COLLEGE

FEED BUYER'S GUIDE

RELATIVE PRICE OF GRAINS CONVERTING BUSHELS TO HUNDREDWEIGHT AND TONS

BASED ON WEIGHT OF BUSHEL						BASED ON WEIGHT OF BUSHEL					
OATS (32 LBS.)	BARLEY & BUCKWHEAT (48 LBS.)	CORN & RYE (56 LBS.)	WHEAT & SOYBEANS (60 LBS.)	PRICE PER (100 LBS.)	PRICE PER TON	OATS (32 LBS.)	BARLEY & BUCKWHEAT (48 LBS.)	CORN & RYE (56 LBS.)	WHEAT & SOYBEANS (60 LBS.)	PRICE PER (100 LBS.)	PRICE PER TON
29¢	43-1/2¢	50-3/4¢	54-3/8¢	$ .91	$18.12-1/2	71¢	106-1/2¢	124-1/4¢	133-1/8¢	$2.22	$44.37-1/2
30	45	52-1/2	56-1/4	.94	18.75	72	108	126	135	2.25	45.00
31	46-1/2	54-1/4	58-1/8	.97	19.37-1/2	73	109-1/2	127-3/4	136-7/8	2.28	45.62-1/2
32	48	56	60	1.00	20.00	74	111	129-1/2	138-3/4	2.31	46.25
33	49-1/2	57-3/4	61-7/8	1.03	20.62-1/2	75	112-1/2	131-1/4	140-5/8	2.34	46.87-1/2
34	51	59-1/2	63-3/4	1.06	21.25	76	114	133	142-1/2	2.37	47.50
35	52-1/2	61-1/4	65-5/8	1.09	21.87-1/2	77	115-1/2	134-3/4	144-3/8	2.41	48.12-1/2
36	54	63	67-1/2	1.12	22.50	78	117	136-1/2	146-1/4	2.44	48.75
37	55-1/2	64-3/4	69-3/8	1.16	23.12-1/2	79	118-1/2	138-1/4	148-1/8	2.47	49.37-1/2
38	57	66-1/2	71-1/4	1.19	23.75	80	120	140	150	2.50	50.00
39	58-1/2	68-1/4	73-1/8	1.22	24.37-1/2	81	121-1/2	141-3/4	151-7/8	2.53	50.62-1/2
40	60	70	75	1.25	25.00	82	123	143-1/2	153-3/4	2.56	51.25
41	61-1/2	71-3/4	76-7/8	1.28	25.62-1/2	83	124-1/2	145-1/4	155-5/8	2.59	51.87-1/2
42	63	73-1/2	78-3/4	1.31	26.25	84	126	147	157-1/2	2.62	52.50
43	64-1/2	75-1/4	80-5/8	1.34	26.87-1/2	85	127-1/2	148-3/4	159-3/8	2.66	53.12-1/2
44	66	77	82-1/2	1.37	27.50	86	129	150-1/2	161-1/4	2.69	53.75
45	67-1/2	78-3/4	84-3/8	1.41	28.12-1/2	87	130-1/2	152-1/4	163-1/8	2.72	54.37-1/2
46	69	80-1/2	86-1/4	1.44	28.75	88	132	154	165	2.75	55.00
47	70-1/2	82-1/4	88-1/8	1.47	29.37-1/2	89	133-1/2	155-3/4	166-7/8	2.78	55.62-1/2
48	72	84	90	1.50	30.00	90	135	157-1/2	168-3/4	2.81	56.24
49	73-1/2	85-3/4	91-7/8	1.53	30.62-1/2	91	136-1/2	159-1/4	170-5/8	2.84	56.87-1/2
50	75	87-1/2	93-3/4	1.56	31.25	92	138	161	172-1/2	2.87	57.50
51	76-1/2	89-1/4	95-5/8	1.59	31.87-1/2	93	139-1/2	162-3/4	174-3/8	2.91	58.12-1/2
52	78	91	97-1/2	1.62	32.50	94	141	164-1/2	176-1/4	2.94	58.75
53	79-1/2	92-3/4	99-3/8	1.66	33.12-1/2	95	142-1/2	166-1/4	178-1/8	2.97	59.37-1/2
54	81	94-1/2	101-1/4	1.69	33.75	96	144	168	180	3.00	60.00
55	82-1/2	96-1/4	103-1/8	1.72	34.37-1/2	97	145-1/2	169-3/4	181-7/8	3.03	60.62-1/2
56	84	98	105	1.75	35.00	98	147	171-1/2	183-3/4	3.06	61.25
57	85-1/2	99-3/4	106-7/8	1.78	35.62-1/2	99	148-1/2	173-1/4	185-5/8	3.09	61.87-1/2
58	87	101-1/2	108-3/4	1.81	36.25	100	150	175	187-1/2	3.12	62.50
59	88-1/2	103-1/4	110-5/8	1.84	36.87-1/2	101	151-1/2	176-3/4	189-3/8	3.16	63.12-1/2
60	90	105	112-1/2	1.87	37.50	102	153	178-1/2	191-1/4	3.19	63.75
61	91-1/2	106-3/4	114-3/8	1.91	38.12-1/2	103	154-1/2	180-1/4	193-1/8	3.22	64.37-1/2
62	93	108-1/2	116-1/4	1.94	38.75	104	156	182	195	3.25	65.00
63	94-1/2	110-1/4	118-1/8	1.97	39.37-1/2	105	157-1/2	183-3/4	196-7/8	3.28	65.62-1/2
64	96	112	120	2.00	40.00	106	159	185-1/2	198-3/4	3.31	66.25
65	97-1/2	113-3/4	121-7/8	2.03	40.62-1/2	107	160-1/2	187-1/4	200-5/8	3.34	66.87-1/2
66	99	115-1/2	123-3/4	2.06	41.25	108	162	189	202-1/2	3.37	67.50
67	100-1/2	117-1/4	125-5/8	2.09	41.87-1/2	109	163-1/2	190-3/4	204-3/8	3.41	68.12-1/2
68	102	119	127-1/2	2.12	42.50	110	165	192-1/2	206-1/4	3.44	68.75
69	103-1/2	120-3/4	129-3/8	2.16	43.12-1/2	111	166-1/2	194-1/4	208-1/8	3.47	69.37-1/2
70	105	122-1/2	131-1/4	2.19	43.75						

HOW TO USE THE FEED BUYER'S GUIDE ON THE OTHER SIDE

Connect with a straight line the price of any low cost high protein feed with the price of any low cost farm grain. Soybean meal and corn are good standards. Use the table above to change bushel price to price per hundredweight. Add grinding costs to farm grains.

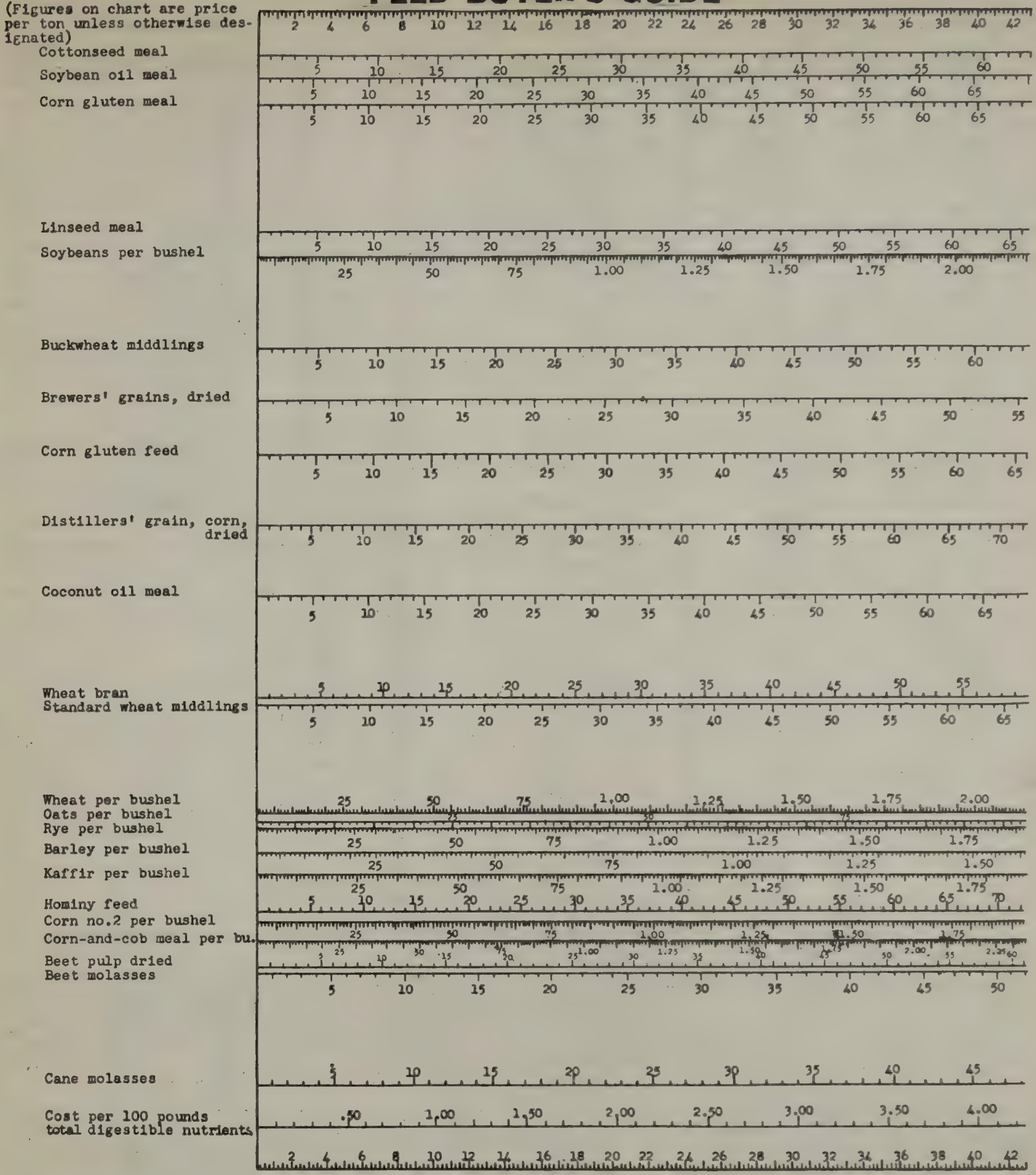
The relative feeding value of all other feeds in terms of money-value is the point at which the straight-line crosses the respective lines. If the actual price of any feed is less than the value shown, it is a good buy in relation to the base feeds. The values in the chart are based on roughage consuming animals and a balanced ration.

NOTE: In abnormal price periods -- when protein-rich feeds are as cheap or cheaper than grains -- the findings of the chart are useless. In this case buy the feed supplying total digestable nutrients (TDN) at the cheapest price and containing enough protein to meet protein requirements.

FEEDS NOT CHARTED -- use a feed of similar composition such as suggested below:

Corn distillers' grain -- Equal to corn glutten feed.
Rye distillers' grain -- Equal to wheat bran.
Hominy -- About the same as corn.
Buckwheat -- Worth 10 to 15 per cent less than oats.
Emmer (Spelt) -- Equal to oats.
Sorghum silage -- Equal to corn silage.
Pea-vine silage -- Worth 85 per cent of corn silage.
Sunflower silage -- 75 per cent of corn silage.
Beet top silage -- 50 per cent of corn silage.
Apples -- Worth 40 per cent of corn silage.

FEED BUYER'S GUIDE



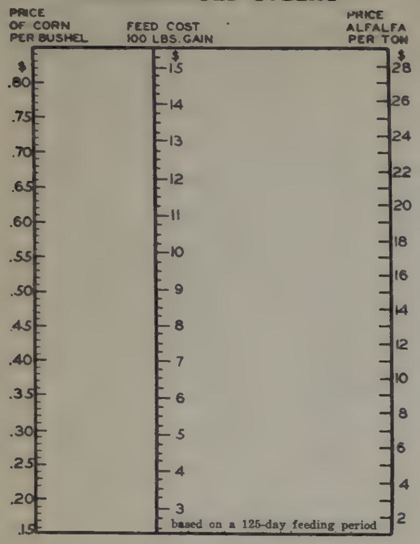
HOW TO USE THE FEED BUYER'S GUIDE

1. When protein-rich feeds are higher in price than grains.
   - a. Connect by straight-edge the per-ton cost of any high protein feed with the per-bushel cost of any low protein feed. Feeds selected should be those which seem cheapest. (Cottonseed meal and corn are good standard products to use)
   - b. The relative feeding value of all other feeds is then determined as the point at which the straight-edge crosses the respective lines. If the actual price of any feed is less than the value shown it is a good buy in relation to the base feeds.
2. When protein-rich feeds are as cheap as the grains. (Value based on total digestible nutrients)
   - a. Place a straight-edge parallel with the left edge of the chart and on the price of any feed which seems to be cheap.
   - b. The relative feeding value based on the TDN of the feed is then determined as the point at which the straight-edge crosses the respective lines. When the actual price of any feed is to the left of the straight-edge it is an economical source of TDN in relation to the base feed. (TDN - total digestible nutrients)
3. Determining the cost per 100 pounds of total digestible nutrients.
   - a. Place straight-edge on the price of any feed and parallel to the left edge of the chart.
   - b. Cost per 100 pounds of TDN is then read directly from the bottom scale which shows cost per 100 pounds TDN.

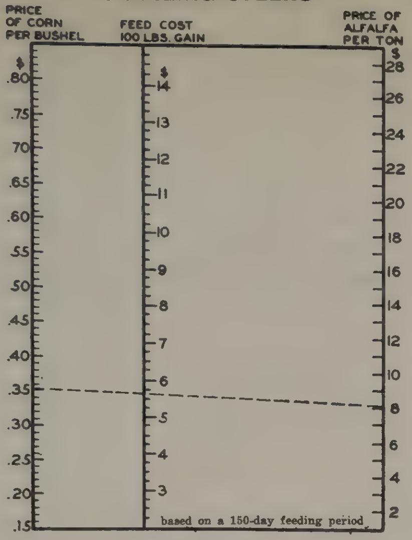
Cornell University data supplemented with other calculations

COSTS OF FEEDING GAINS

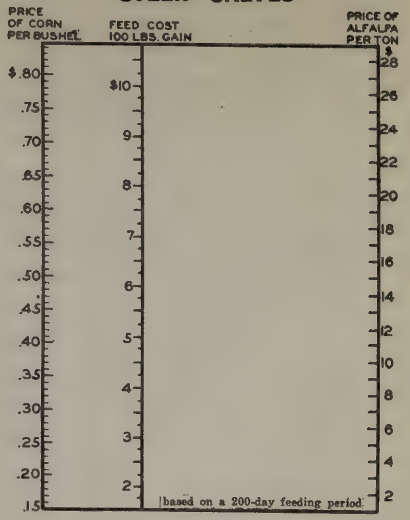
TWO-YEAR-OLD STEERS



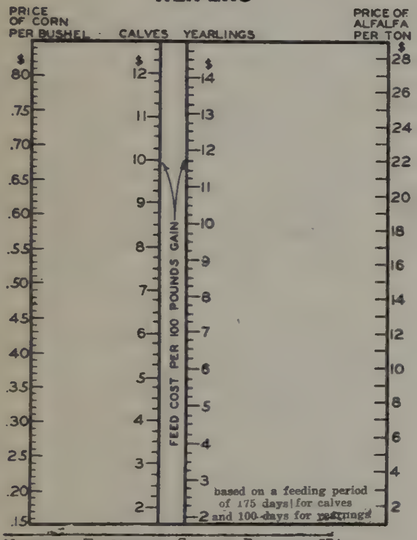
YEARLING STEERS



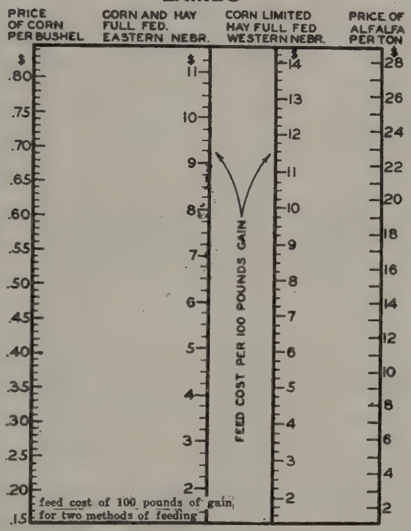
STEER CALVES



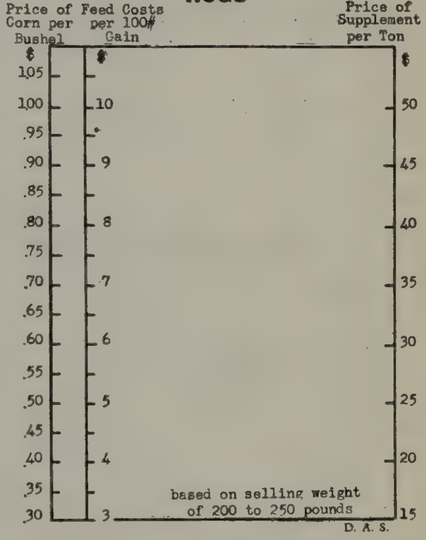
HEIFERS



LAMBS

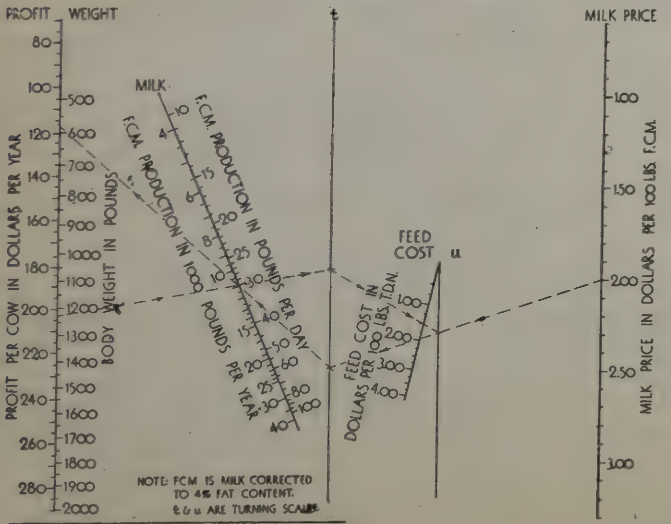


HOGS



Nebraska Experiment Station Bulletin 274

ESTIMATING PROFITABLENESS OF DAIRY COWS *



Missouri Agricultural Experiment Station Bulletin 368

To use the cost per 100 pounds gain charts, first place one end of a ruler on the price of corn, on the left-hand scale. Second, place the other end on the price of alfalfa (protein supplement for hogs) on right-hand scale. The point where the line crosses the intermediate scale indicates the cost of producing 100 pounds of gain at those feed prices.

To determine relative value of other feeds in these charts refer to the Feed Buyer's Guide page 517.

These are rough guides based on average experience. They show when costs of gains are getting badly out of line with markets. Good management with thrifty well-selected livestock and skillful feeding will get better than average results. The converse is likewise true.

DAIRY PROFITS

This chart provides a quick estimate of the profits to be secured from dairy cows. The procedure is as follows:

Beginning with the weight of the cow, extend a line through the average production to the point where it intersects the line "t". From "t" extend a line through feed cost to line "u". Through this point on line "u" extend a line from the price per 100 pounds of milk to line "t". Finally, connect this point on line "t" with the average production and extend to determine the "profits per cow".

(Note the example of the 1200 pound cow and the $117 profit secured when she produced 30 pounds of milk per day with feed cost at $1.50 per cwt. and milk price at $2.00 per cwt.)

PLANNING THE FARM BUSINESS

WHAT an architect's specifications are to a building contractor, a farm plan is to a farmer. It gives effective direction to the work that is to be done. It should therefore above all things be practical, so that it can actually be worked out on the farm for which it is intended, by the farmer who makes it, with the resources that are at his command.

A good farm plan usually makes adequate provision for (1) an arrangement of fields and a cropping system that will bring a maximum income over a period of years and at the same time maintain fertility and control erosion; (2) a livestock system adapted to the amounts and kinds of feed produced and the markets available; (3) the efficient use of available labor; (4) the kinds and amounts of power and machinery to do the required work at the least possible cost; (5) an adequate volume of business; and (6) a choice of enterprises which fit together well and give a proper balance to the business as a whole.

Proceed Systematically

Set about your planning in a methodical, systematic way.

Complete each step in the order given here before going on to the next.

FIRST STEP: INVENTORY OF PHYSICAL RESOURCES.

A critical and an unbiased study of the farm is the first step in farm planning. This study must be thoro, for unless the problems are recognized and are seen in their proper relationships, they cannot be correctly solved. As in medicine, the diagnosis must precede the cure.

The study should take into consideration all the resources or handicaps that may affect the organization and operation of the farm—the soil types, topography, erodability, productivity, detriments and hazards, cropping systems, buildings, kinds and numbers of livestock, tenure, available labor, machinery, and so forth.

A map of the present arrangement of the farm, soil tests and maps showing the needs for lime and phosphorus, and inventories of fields, buildings, labor, and equipment are important parts of the first step in making a workable plan for a farm.

SECOND STEP: LONG-TIME LAND-USE PLAN.

After a careful inventory of the physical resources of the farm has been made, the next step is to set up a long-time plan for using the land to the best advantage. This long-time plan will include: (1) a map showing the future arrangement of fields and the cropping system to be followed on each field; and (2) an estimate of the quantities of each crop that will be produced under the new plan.

Future Field Arrangement

Base the new arrangement on the "lay of the land" on your farm and the quality or nature of the soil. Follow a definite procedure in mapping the future arrangement of the fields:

1. Mark off and label on the map all areas *not* to be included in the cropping system, such as land in permanent pasture or hay, woodlands, and wastelands.

2. For the remaining areas—the cropland of the farm—decide upon the cropping system and mark off the fields. Divide the area that is to be included in one rotation into as many fields as there are years in the rotation. In deciding on the rotations and field arrangement observe the following points:

(a) Select rotations adapted to the types of soil on your farm.

(b) Include in each rotation enough deep-rooted legumes to maintain or to increase crop yields.

(c) Choose rotations that provide flexibility in acreage, in sequence, and in kind of crops.

(d) Build the rotation around the major crop to be grown—that is, around corn, or wheat, or some other crop.

(e) Locate and shape the fields in such a way that erosion can be controlled to the best advantage.

(f) Choose a rotation that will result in a large percent of the land being covered with a growing crop thruout the year, so as to give better control of erosion and of leaching.

(g) Consider such detriments and hazards as weeds, insects, diseases, floods.

(h) Provide for the economical use of labor and power.

THIRD STEP: FITTING THE LIVESTOCK TO THE FARM.

In planning a livestock program to fit the needs of the farm, start by considering the amounts and kinds of roughages to be grown and the way in which they can be most profitably disposed of. Select roughage-consuming livestock, such as cattle or sheep, for a roughage-producing farm. Keep in mind that hogs are destructive to grass waterways, terraces, dams, and other soil-saving structures. Hogs are better adapted to grain farms.

University of Illinois
Department of Agricultural Economics

(Printed in U. S. A.)
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FARM PLANNING

FOURTH STEP: PLANNING THE MARKETING PROGRAM AND ESTIMATING

Since many years may be required to put a complete new plan into operation, it is particularly important to know before the plan is adopted that it is likely to give the desired results. Experimentation must be eliminated in so far as possible.

This step in the farm planning is a method of testing or checking the plan by ascertaining the probable *net income* that will result from adoption of the plan. Each farmer should consider the various possibilities for his farm, should formulate several plans, and then select the one that will lead to the highest possible profit over a period of years.

In planning the marketing program and estimating expenses, quantities of products that it is estimated will be sold under the new plan are entered at average farm prices, and an estimate of expenses likely to be incurred is made. The price applied to each product should be the average of prices over at least the five preceding years, adjusted to the future outlook for the product.

FIFTH STEP: TRANSITION FROM OLD TO NEW PLAN.

A new plan for a farm cannot be put into full operation all at once. The necessary changes must be made gradually, each leading toward the final stage of the plan. For example, where lime is needed for the growing of legumes, the legumes should not be seeded, usually, until about a year after the lime is applied. Similarly, livestock numbers should not be expanded until hay and pasture are available to support them.

PRACTICES THAT REDUCE CASH COSTS

1. Fit machinery to needs of farm.
2. Cooperate with other farmers in ownership of expensive equipment.
3. Do custom work to reduce overhead cost.
4. Avoid an excess of power.
5. Repair machines at home in slack periods.
6. Feed horses according to work done.
7. Avoid an excess of labor.
8. Control costs of building, fencing, and other improvements.
9. Test soil to save clover and alfalfa seed.
10. Grow legumes on adapted land.
11. Use home-produced food.
12. Develop a farm and home budget.

PRACTICES THAT REQUIRE LITTLE EXPENSE

1. Use high-yielding seeds.
2. Test seeds for germination.
3. Control crop diseases and insects.
4. Store seed and crops carefully.
5. Make careful use of all manure.
6. Protect stand of crops.
7. Prepare a good seed bed.
8. Control weeds.
9. Grow the higher profit crops.
10. Control livestock diseases.
11. Feed balanced rations.
12. Use home-grown feed.
13. Produce according to markets.
14. Form habit of timeliness.
15. Keep the Illinois Farm Account.

PRACTICES THAT REQUIRE TIME OR EXPENSE

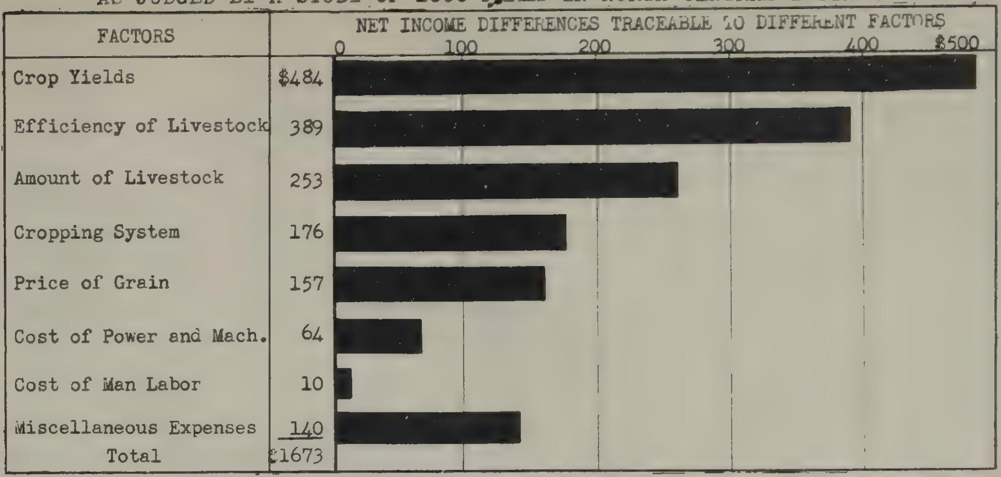
1. Use limestone where needed.
2. Keep much land in legumes.
3. Use a good crop rotation.
4. Arrange field system with care.
5. Provide good drainage.
6. Use phosphate and potash where profitable.
7. Keep high-producing livestock.
8. Fit livestock to the farm.
9. Develop a large enough business.

ARRANGEMENT OF THE FARMSTEAD

1. Include in the farmstead enough land for attractiveness and the reduction of fire hazards, but not so much as to be uneconomical in land use or in the convenience of caring for livestock.
2. Arrange the buildings and locate the farmstead so as to secure desirable views both from and toward the residence.
3. Locate the windbreak to the north and west of the farmstead.
4. Face poultry houses, hog houses, and open-front buildings toward the south.
5. Locate the feedlots so as to avoid objectionable odors at the residence.
6. Place buildings, lots, and drives where proper drainage can be secured.
7. Place buildings, lots, drains, and wells so as to avoid contamination of the water supply.
8. Arrange buildings and lots for convenience in handling livestock and equipment.
9. Provide convenient outlets from the farmstead to the pastures and fields.

PROFITABLE FARM PRACTICES

AS JUDGED BY A STUDY OF 1000 FARMS IN NORTH-CENTRAL ILLINOIS



EXTENT OF DIFFERENCE BETWEEN THE MOST PROFITABLE AND LEAST PROFITABLE FARMS, 1925-1934
CROP YIELDS AND LIVESTOCK EFFICIENCY ACCOUNTED FOR MORE THAN ONE-HALF OF THE TOTAL DIFFERENCE

Farm operators, farm owners, and all those who deal with or finance farmers should know what factors control farm earnings. Here is at least part of the answer for Corn Belt farms.

I. Crop Yields per acre are most important. High yields per acre rapidly increase earnings and are obtained by:

(a) Soil treatments - (most important)
(b) Good cultural practices
(c) Seed selection and treatment

II. Efficiency of Livestock is also outstandingly important. This is measured in the amount of livestock income compared to the value of feed consumed. The types and classes of livestock handled, and the judgment used in properly timing purchases and sales, as well as other management factors, determine the margin of return above feed costs.

III. Amount of Livestock is a factor. The farms with the largest earnings have more livestock. Through the production and feeding of livestock, the grain and feed produced are increased in value.

IV. Cropping Systems of the most profitable farms contain a larger percentage of high income crops. More tillable land is in corn, canning crops, barley, and alfalfa, and less in oats and timothy.

V. Prices Received for grain are almost as important as the cropping system. The higher prices received for grain on the more profitable farms is due in part to quality.

VI. Cost of Power and Machinery in the case of the Illinois farms resulted in a difference of 26 cents per acre, or a total of $64.00 per farm in favor of the more profitable farms.

VII. Cost of Man Labor showed the smallest differential - only 4 cents an acre. It is significant to note that although more grain was grown per acre and more livestock was maintained on the more profitable farms, the cost of labor per acre was lower.

VIII. Miscellaneous Expenses were 57 cents per acre less on the most profitable farms. This includes maintenance of improvements and all other expenses not directly chargeable to labor, power, and machinery.

All of these factors are of sufficient importance that the neglect of any will seriously impair the profitableness of a farm. The combined effects of the crop factors, i.e., crop yields, cropping systems, and price of grain, account for about one-half of the difference between the farms of highest and lowest earnings. The amount and efficiency of livestock are almost equally important.

All of these are primarily management factors. Regardless of its productive ability, no farm can produce profits over any extended period unless the management is competent.

Farmers should check their efficiency according to the foregoing factors and the detail on the following pages. Those financing and working with farm operators should be aware that farm profits are dependent upon these definite, measurable factors.

Bulletin 444, Illinois Agricultural Experiment Station

CROP PRACTICES THAT INCREASE EARNINGS

On the foregoing page it hasbbeen shown that crop yield per acre is the most important factor controlling farm profits. Some of the crop practices in use by successful farmers in north-central Illinois are briefly as follows:

CORN PRODUCTION

Good corn production practices accounted for increased yields totaling over 31 bushels per acre on soils well treated, 26 bushels on fair land, and over 16 bushels on soils receiving poor treatment. These increased yields on the single crop, corn, are sufficient to make the difference between success or failure on many farms.

Soil Treatments

Clover in the rotation increased yields as much as 5 bushels per acre. Sweet clover and alfalfa gave best results. (Checks show that when removed from the land, soybeans cannot be considered a soil-building crop.)

Raw rock phosphate at the rate of 1000 pounds an acre increased yields about 4 bushels per acre.

Manure (apparently only light applications were used) increased yields about 3 bushels per acre.

These soil treatments, although by no means all of those that are desirable, seemed to account quite definitely for about a 12-bushel increase in corn yields.

Cultural Practices - The following were used by farmers obtaining high yields, and checks showed these practices to be superior.

Fall-plowed ground worked early in the spring.
Spring-plowed ground harrowed or pulverized immediately after plowing.
Harrowing and weeding after planting and before the corn comes up.
Blade cultivators gave slightly better results than shovel cultivators on soil in good condition.
Shovel cultivators had a decided advantage on soils in poor condition.
Three cultivations were adequate on well treated soils where the seed bed had been properly prepared.

Three stalks to a hill produced 9 bushels more per acre than two stalks on good land, and even showed increases on fair to poorly treated land.

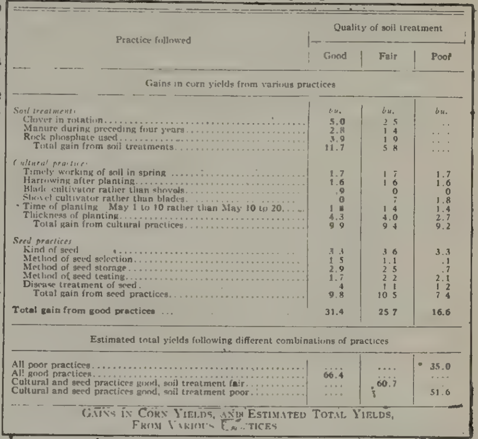
Early May planting showed some advantage over planting later in the month.

(Rolling after planting and before the corn comes up, and the use of a harrow or weeder on young corn before row cultivation begins apparently are not worthwhile practices unless special conditions exist.)

Seed Practices - resulting in higher yields

Use of recommended high-yielding strains of seed.
Early selection of seed from stalk.
Careful drying and storage of seed was very profitable.
Ear testing for germination and disease.
Treating seed for disease showed a small increase.
Large-eared corn produced more, particularly on poorly treated soils.
Smooth-eared corn yielded most, especially on well treated soils.

The accompanying table summarizes the profitable corn-growing practices and shows average results to be expected.



Practice followed	Quality of soil treatment		
	Good	Fair	Poor
Gains in corn yields from various practices			
Soil treatments	*bu.*	*bu.*	*bu.*
Clover in rotation	5.0	2.5	..
Manure during preceding four years	2.8	1.4	....
Rock phosphate used	3.9	1.9	....
Total gain from soil treatments	11.7	5.8	....
Cultural practices			
Timely working of soil in spring	1.7	1.7	1.7
Harrowing after planting	1.6	1.6	1.6
Blade cultivator rather than shovels	.9	0	0
Shovel cultivator rather than blades	0	7	1.8
Time of planting May 1 to 10 rather than May 10 to 20	1.[illegible]	1.4	1.4
Thickness of planting	4.3	4.0	2.7
Total gain from cultural practices	9.9	9.4	9.2
Seed practices			
Kind of seed	3.3	3.6	3.3
Method of seed selection	1.5	1.1	.1
Method of seed storage	2.9	2.5	.7
Method of seed testing	1.7	2.2	2.1
Disease treatment of seed	4	1.1	1.2
Total gain from seed practices	9.8	10.5	7.4
Total gain from good practices	31.4	25.7	16.6
Estimated total yields following different combinations of practices			
All poor practices	....	....	35.0
All good practices	66.4	....	....
Cultural and seed practices good, soil treatment fair	....	60.7	
Cultural and seed practices good, soil treatment poor	....		51.6

GAINS IN CORN YIELDS, AND ESTIMATED TOTAL YIELDS, FROM VARIOUS PRACTICES

OAT PRODUCTION

Good oat production practices accounted for increased yields totaling about 40 bushels on soils receiving good treatment and 17½ bushels on soils receiving poor treatment.

Soil Treatments

Rock phosphate on soils given good treatment apparently increased yields over 7 bushels per acre and showed more results than any other single treatment.

Manure ranked next in soil treatment results.

Clover was less effective,probably due to the practice of growing two crops of corn on clover sod before it is planted to oats.

Cultural Practices - used by farmers obtaining high yields

Double disking of ground before seeding increased yields. On poorly treated soils, the increase was over 4 bushels per acre.

Single disking after seeding proved best on soils receiving good treatment.

Double disking after seeding produced higher yields on soils given poor treatment.

Tractor disking before seeding showed some increase over use of horses but showed no advantage after seeding.

Harrowing with horses after seeding produced 0.6 bushels more per acre than harrowing with a tractor.

Rollers used either before or after the oats came up increased yields as much as 2.3 bushels per acre. The increase was especially noticeable in dry years.

Early seeding proved superior. March seeding yielded, on an average, 5.7 bushels more per acre on well treated soils than April seeding.

The seeding of more than 2 to 2½ bushels of seed per acre did not prove profitable.

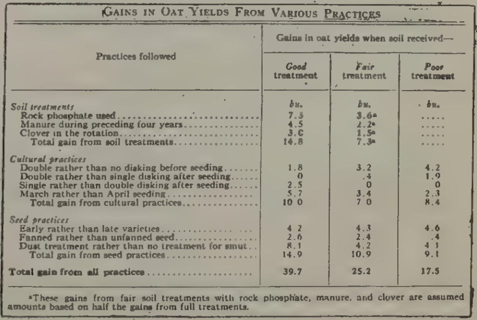
Seed Practices

Early varieties yielded over 4 bushels per acre more on soils receiving all types of treatment.

Fanned seed increased yields from 0.4 to 2.6 bushels per acre.

Dust treatment for smut was superior to other methods of treatment and increased yields as much as 8 bushels per acre on well treated soils.

GAINS IN OAT YIELDS FROM VARIOUS PRACTICES



Practices followed	Gains in oat yields when soil received—		
	Good treatment	*Fair* treatment	*Poor* treatment
Soil treatments	*bu.*	*bu.*	*bu.*
Rock phosphate used	7.3	3.6[a]	.....
Manure during preceding four years	4.5	2.2[a]	.....
Clover in the rotation	3.C	1.5[a]	.....
Total gain from soil treatments	14.8	7.3[a]	.....
Cultural practices			
Double rather than no disking before seeding	1.8	3.2	4.2
Double rather than single disking after seeding	0	.4	1.9
Single rather than double disking after seeding	2.5	0	0
March rather than April seeding	5.7	3.4	2.3
Total gain from cultural practices	10.0	7.0	8.4
Seed practices			
Early rather than late varieties	4.2	4.3	4.6
Fanned rather than unfanned seed	2.6	2.4	.4
Dust treatment rather than no treatment for smut	8.1	4.2	4.1
Total gain from seed practices	14.9	10.9	9.1
Total gain from all practices	39.7	25.2	17.5

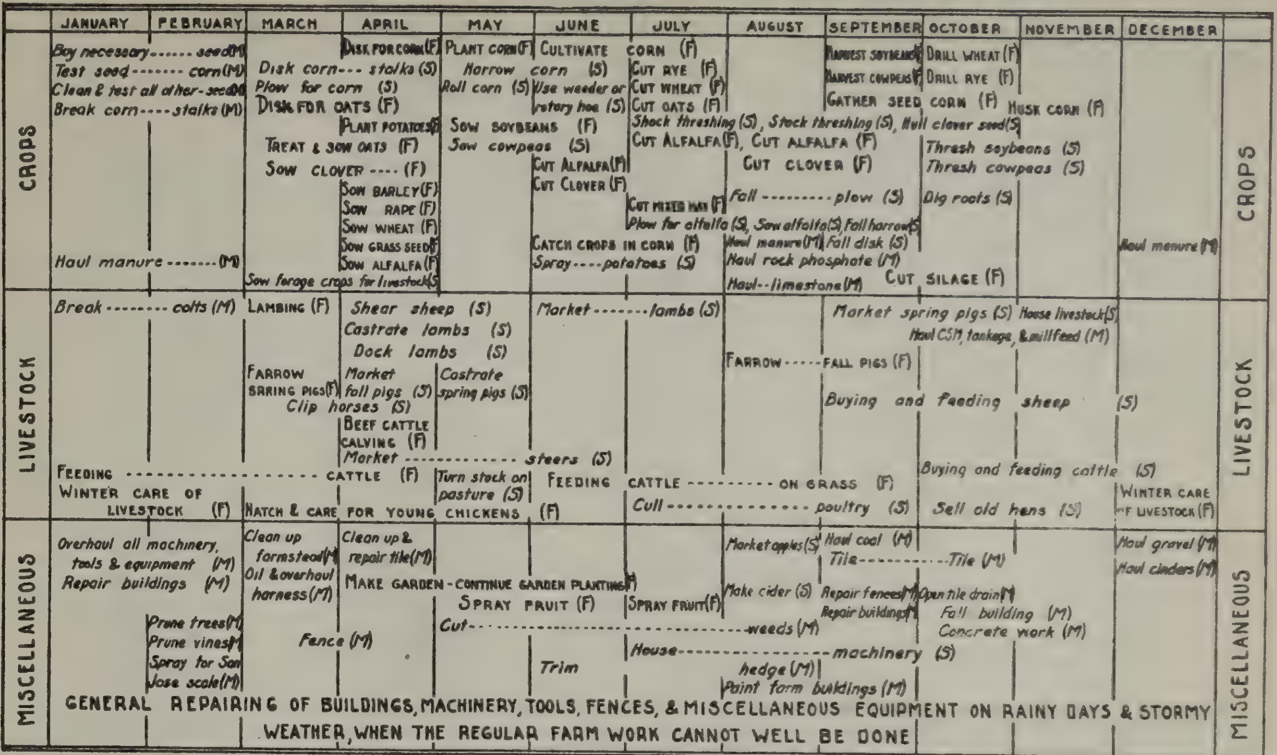
[a] These gains from fair soil treatments with rock phosphate, manure, and clover are assumed amounts based on half the gains from full treatments.

The accompanying table summarizes the results obtained by the various oat-growing practices.

These results and conclusions are based on an analysis of supervised accounting records. Data were available from approximately 1000 farms and 5000 fields, all in north-central Illinois. Before some of these practices are adopted in other localities, results of local experimental tests and other data should be studied.

Bulletin 444, Illinois Agricultural Experiment Station

FARM LABOR CALENDAR



JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER

CROPS

Buy necessary ------ seed (M)
Test seed ------- corn (M)
Clean & test all other-seed (M)
Break corn ---- stalks (M)
Haul manure ------- (M)
Disk corn --- stalks (S)
Plow for corn (S)
Disk for oats (F)
Treat & sow oats (F)
Sow clover ---- (F)
Sow forage crops for livestock (S)
Disk for corn (F)
Plant potatoes (F)
Sow barley (F)
Sow rape (F)
Sow wheat (F)
Sow grass seed (F)
Sow alfalfa (F)
Plant corn (F)
Harrow corn (S)
Roll corn (S)
Sow soybeans (F)
Sow cowpeas (S)
Cultivate corn (F)
Use weeder or rotary hoe (S)
Cut alfalfa (F)
Cut clover (F)
Catch crops in corn (F)
Spray ---- potatoes (S)
Cut rye (F)
Cut wheat (F)
Cut oats (F)
Shock threshing (S), Stack threshing (S), Hull clover seed (S)
Cut alfalfa (F), Cut alfalfa (F)
Cut mixed hay (F)
Plow for alfalfa (S), Sow alfalfa (S), Fall harrow (S)
Cut clover (F)
Fall --------- plow (S)
Haul manure (M)
Fall disk (S)
Haul rock phosphate (M)
Haul -- limestone (M)
Harvest soybeans (F)
Harvest cowpeas (F)
Gather seed corn (F)
Cut silage (F)
Drill wheat (F)
Drill rye (F)
Thresh soybeans (S)
Thresh cowpeas (S)
Dig roots (S)
Husk corn (F)
Haul manure (M)

LIVESTOCK

Break -------- colts (M)
Feeding ---------------------- cattle (F)
Winter care of livestock (F)
Lambing (F)
Farrow spring pigs (F)
Clip horses (S)
Hatch & care for young chickens (F)
Shear sheep (S)
Castrate lambs (S)
Dock lambs (S)
Market fall pigs (S)
Beef cattle calving (F)
Market -------------- steers (S)
Castrate spring pigs (S)
Turn stock on pasture (S)
Market ------- lambs (S)
Feeding cattle --------- on grass (F)
Cull --------------- poultry (S)
Farrow ----- fall pigs (F)
Market spring pigs (S)
Haul CSM, tankage, & millfeed (M)
Buying and feeding sheep (S)
Buying and feeding cattle (S)
Sell old hens (S)
House livestock (S)
Winter care of livestock (F)

MISCELLANEOUS

Overhaul all machinery, tools & equipment (M)
Repair buildings (M)
Prune trees (M)
Prune vines (M)
Spray for San Jose scale (M)
Clean up farmstead (M)
Oil & overhaul harness (M)
Fence (M)
Clean up & repair tile (M)
Make garden - continue garden planting (F)
Spray fruit (F)
Cut ------------------------------ weeds (M)
Trim ----- hedge (M)
Spray fruit (F)
House --------------- machinery (S)
Market apples (S)
Make cider (S)
Paint farm buildings (M)
Haul coal (M)
Tile ----------- Tile (M)
Repair fences (M)
Repair buildings (M)
Open tile drain (M)
Fall building (M)
Concrete work (M)
Haul gravel (M)
Haul cinders (M)

GENERAL REPAIRING OF BUILDINGS, MACHINERY, TOOLS, FENCES, & MISCELLANEOUS EQUIPMENT ON RAINY DAYS & STORMY WEATHER, WHEN THE REGULAR FARM WORK CANNOT WELL BE DONE

This calendar is based on conditions found on the ordinary farms of the corn belt and applies particularly to central Illinois. Many operations listed will vary with latitude and season and, to some extent, with individual farms. The letters that follow the operation indicate whether they are fixed (F) as to the time the work must be done, semi-fixed (S), or movable (M).

For the successful execution of a farm enterprise it is necessary for the operator to have definitely in mind just what should be done next. Hired help made idle by an afternoon shower or a breakdown of the farm machinery usually can be turned to some other constructive work if the operator knows what should be done next. Plans should be constantly projected ahead. Many successful operators carry a notebook in which they jot down jobs to be done when just such delays occur. Being ready with alternate courses of action is the mark of a good farm manager.

The above labor calendar prepared especially for the Corn Belt is a helpful guide in planning the farm program for efficient use of labor and equipment. It should not be interpreted as a set rule by which to do all farm work, but many farm labor problems can be solved by carefully studying the farm program in light of this calendar. It is especially helpful in distributing labor and thus avoiding insofar as possible peak labor requirements especially in critical times such as harvest.

Two guides which have proved of value in planning the farm work from day to day are:

1. In slack periods do not leave until tomorrow any job which can as well be done today.
2. In rush periods perform no work today which can as well be done tomorrow.

Calendar from U. of Ill. Bulletin 329

COSTS AND EFFICIENCY FACTORS

CHAMPAIGN AND PIATT COUNTIES, COST OF PRODUCTION, INCOME, AND EFFICIENCY FACTORS, (5-Year Average) 1933-37

ITEM	CORN	OATS	WINTER WHEAT (COMBINED)	SOYBEANS (COMBINED)	SOYBEAN HAY
GROWING COSTS PER ACRE					
Man labor	$ 1.10	$ .23	$ .43	$ .59	$ .61
Horse labor	.99	.23	.38	.33	.50
Tractor use	1.23	.28	.55	.95	.72
Machinery	.68	.18	.27	.42	.40
Seed	.49	1.24	1.64	2.33	2.11
Fertilizer	.94	.57	.65	.27	.35
General farm expense	1.23	.70	.55	.59	1.62
Miscellaneous	.02		.11	.07	
Total growing cost	$ 6.68	$ 3.43	$ 4.58	$ 5.55	$ 6.31
HARVESTING COSTS PER ACRE					
Man labor	$ 1.21	$ .88	$ .30	$ .25	$ 2.18
Horse labor	.85	.50	.12	.09	1.19
Tractor	.15	.24	.23	.20	.04
Picker expense	.20				
Twine		.16			
Threshing and fuel		.45			
Machinery		.27			.69
Combining		.19	1.07	1.36	
Total harvesting costs	$ 2.41	$ 2.69	$ 1.72	$ 1.90	$ 4.10
TOTAL GROWING AND HARVESTING COSTS PER ACRE	$ 9.09	$ 6.12	$ 6.30	$ 7.45	$10.41
LAND CHARGES PER ACRE					
Taxes	$ 1.24	$ 1.25	$ 1.20	$ 1.21	$ 1.22
Interest on land at 5 per cent	6.74	6.61	6.94	6.80	6.37
TOTAL ACRE-COST	$17.07	$13.98	$14.44	$15.46	$18.00
INCOME PER ACRE					
Grain	$23.64	$ 9.81	$17.53	$19.18	
Straw		1.23			
Pasture	.55	.48	.59	.04	
Hay					16.23
Total acre-income	$24.19	$11.52	$18.12	$19.22	$16.23
NET PROFIT OR LOSS PER ACRE	$ 7.12	$-2.46	$ 3.68	$ 3.76	$-1.77
EFFICIENCY FACTORS					
Net cost per bushel, per ton	$ .43	$ .42	$ .75	$ .61	$10.93
Price per bushel, per ton	.59	.30	.90	.76	9.55
Net profit or loss per bushel; per ton	.16	- .13	.15	.15	-1.38
Yield per acre, bushels; tons	42.7	34.7	19.9	25.4	1.7
Man labor per acre, hours	10.0	5.7	3.7	4.4	14.3
Horse labor per acre, hours	17.1	6.6	5.3	4.4	16.1
Tractor use per acre, hours	2.6	1.0	1.5	2.2	1.4
Man labor per bushel, hours	.26	.08	.19	.17	8.5
TOTAL ACRES STUDIED	2201	1138	311	1037	91

ITEM	1933-1937 ALFALFA HAY	1933-1935 CLOVER HAY	1933-1935 TIMOTHY HAY
GROWING AND HARVESTING COSTS PER ACRE			
Man labor	$ 2.61	$ 1.74	$ 1.31
Horse labor	2.02	1.11	.40
Tractor use	.26	.18	.21
Seed	.93	.39	
Machinery	1.07	.38	1.14
Fertilizer	.64	.08	.07
Hulling		.48	
Threshing			.60
General farm expense	1.59	.90	.69
Miscellaneous	.05		
Total growing and harvesting costs	$ 9.17	$ 5.26	$ 4.42
LAND CHARGES PER ACRE			
Taxes	$ 1.29	$ 1.27	$ 1.50
Interest on land at 5 per cent	6.88	7.18	6.73
TOTAL ACRE-COST	$17.34	$13.71	$12.65
INCOME PER ACRE			
Hay	$22.12	$10.03	$ 6.43
Seed	.72	3.27	4.20
Pasture	.49	.32	.45
Total acre-income	$23.33	$13.62	$11.08
NET PROFIT OR LOSS PER ACRE	$ 5.99	$ -.09	$-1.57
EFFICIENCY FACTORS			
Net cost per ton	$ 8.37	$ 8.36	$ 7.55
Price of hay per ton	11.40	8.29	6.07
Price seed per bushel		7.43	1.50
Net profit or loss per ton	3.03	- .07	-1.48
Yield per acre - hay, tons	2.0	1.21	1.06
seed, bushels		.44	4.6
Man labor per acre, hours	13.7		7.7
Horse labor per acre, hours	16.3	9.7	6.3
Tractor use per acre, hours	.5	11.6	.72
Man labor per ton, hours	7.07	8.0	7.2
TOTAL ACRES STUDIED	64	518	33

Costs of grain production income and efficiency factors for cash grain areas in the Corn Belt are indicated by the farm account records of Champaign and Piatt counties, Illinois. This is an area of level to moderately rolling land, very fertile and over 90 per cent tillable. Corn is the principal crop and normally occupies close to one-half of the tillable land. Under these favorable conditions these figures should be effective standards against which to check farm operating costs.

Bulletin No. 467 Illinois Agricultural Experiment Station

THE FARM SILO

A silo is a space saver. One cubic foot of silage is equivalent to 3 cubic feet of baled hay or 6 cubic feet of loose hay, on a feed substitution basis. A cubic foot of silage contains at least three times as much dry weight of feed as a cubic foot of long hay stored in the mow.

FEED STORED PER CU. FT. OF SPACE (Avg.)

	Long (whole) Hay	Corn Silage	Grass Silage
Feed Stored Per Cu. Ft.	5 lbs.	40 lbs.	45 lbs.
Dry Weight of Feed Stored Per Cu. Ft.	4	12	14

Source: Portland Cement Co.

The capacity of a silo for sorghum silage containing a good proportion of grain is almost the same as for corn silage. Grass silage is about 10 to 12 per cent heavier than corn silage that contains the same percentage of dry matter. If the grass is wilted before ensiling, so that the percentage of dry matter is 30 per cent or more, the silage may be no heavier than corn silage.

The following table shows the estimated capacity of silos of various sizes. The depth indicated is the actual depth of the settled silage and not the height of the silo. To use this table, measurement of silage depth should be taken after the silage has settled for thirty days or more. Silage settles very little after the first thirty days.

CAPACITIES OF ROUND SILOS IN TONS

Depth of Silage in feet	10-ft. Diameter	12-ft. Diameter	14-ft. Diameter	16-ft. Diameter	18-ft. Diameter	20-ft. Diameter
	TONS	TONS	TONS	TONS	TONS	TONS
10	13.7	19.8	27.0	35.2	44.5	55.0
11	15.3	22.0	29.9	39.0	49.3	61.0
12	16.8	24.2	32.9	42.9	54.3	67.1
13	18.3	26.4	35.9	46.9	59.3	73.3
14	19.9	28.7	39.0	50.9	64.4	79.6
15	21.4	30.9	42.0	54.9	69.3	85.7
16	23.1	33.2	45.2	59.0	74.6	92.2
17	24.6	35.5	48.3	63.0	79.7	98.5
18	26.2	37.8	51.4	67.1	84.8	104.8
19	27.8	40.1	54.6	71.2	90.0	111.3
20	29.5	42.4	57.8	75.4	95.3	117.8
21	31.0	44.7	60.8	79.4	100.3	124.0
22	32.7	47.0	64.0	83.6	105.6	130.5
23	34.3	49.4	67.3	87.8	110.5	137.2
24	35.9	51.1	70.4	91.9	116.1	143.6
25	37.6	54.2	73.7	96.2	121.6	150.3
26	39.2	56.5	76.9	100.3	126.8	156.8
27	40.9	58.9	80.2	104.7	132.4	163.6
28	42.6	61.3	83.4	108.8	137.6	170.1
29	44.3	63.7	86.9	113.4	143.3	177.1
30	45.9	66.1	90.1	117.6	148.6	183.7
31	47.6	68.5	93.4	121.1	154.1	180.9
32	49.3	70.9	96.7	126.2	159.5	196.2
33	51.0	73.4	100.0	130.5	165.0	202.4
34	52.7	75.8	103.3	134.8	170.5	208.0
35	54.4	78.2	106.6	139.1	175.9	214.9
36	56.1	80.7	110.0	143.5	181.4	221.2
37	57.8	83.1	113.3	147.8	186.9	227.4
38	59.5	85.8	116.6	152.1	192.4	233.7
39	61.2	88.0	119.9	156.4	197.8	239.9
40	62.8	90.4	123.2	160.7	203.3	246.2
41	64.5	92.8	126.5	165.0	208.8	252.4
42	66.2	95.2	129.8	169.3	214.2	258.6
43	67.9	97.7	133.1	173.6	219.7	264.9
44	69.6	100.1	136.4	177.9	225.2	271.2
45	71.3	102.7	139.7	182.2	230.6	277.4

(Kansas State College, University of Illinois, University of Missouri.)

For corn ensiled when less mature than usual, and for grass silage, add 10 to 15 per cent to the capacity given. If corn is unusually rich in grain, add 5 to 10 per cent. If corn is unusually dry when ensiled, deduct 10 to 15 per cent. If very little grain is present, deduct 10 per cent.

ESTIMATING AMOUNT OF SILAGE

To estimate the amount of silage remaining in a silo after part has been fed out, find the actual depth left and estimate the original total depth of silage after settling. Then subtract the amount fed from the original tonnage to find the tonnage left. Example:

Assume that 10 feet of silage is left in a silo having a diameter of 14 feet, and that after settling, the entire depth of silage was 40 feet before the feeding started. Referring to the tonnage capacity table, we find that at first the silo contained 123.2 tons.

14 foot diameter to 40 foot depth = capacity of 123.2 tons.

The top 30 feet of silage were fed out and contained approximately 90.1 tons.

14 foot diameter to 30 foot depth = capacity of 90.1 tons.

The difference, 123.2 - 90.1 = 33.1 tons, is the approximate weight of the silage left in the remaining 10 feet.

SIZE OF SILO TO BUILD

—Approximate number of animals required to remove 2 in. of silage per day*, from silos of various diameters and at different rates of feeding

Diameter, ft.	Lb. of silage to be removed daily	Number of animals that may be fed with daily allowance of:			
		40 lb.	30 lb.	20 lb.	15 lb.
10	525	13	18	26	35
12	755	19	25	38	50
14	1,030	26	34	52	69
16	1,340	34	45	67	90
18	1,700	42	57	85	113
20	2,100	53	70	105	140

*This is for winter feeding; 3 in. should be removed in summer.

Source: Portland Cement Co.

The diameter of a silo should be determined by the number and kind of animals to be fed. To avoid spoilage, the diameter should be such that 2 or 3 inches of silage can be fed per day. The height of the silo depends upon the length of the feeding period -- usually 180 to 240 days.

—Quantity of silage required† and economical diameter of silo for the dairy herd

Number of dairy cows in herd	Feed for 180 days			Feed for 240 days		
	Estimated tonnage of silage consumed	Size of silo		Estimated tonnage of silage consumed	Size of silo	
		Diameter	Height		Diameter	Height
	Tons	Ft.	Ft.	Tons	Ft.	Ft.
13	47	10	26	63	10	34
15	54	10	30	72	12	28
20	72	12	28	96	12	35
25	90	12	33	123	14	34
30	108	14	30	144	14	39
35	126	14	34	168	16	35
40	144	14	39	192	16	39
45	162	16	34	216	16	43
50	180	16	37	240	18	39
60	216	16	44	288	18	46
70	252	18	41	336	20	44

†Based on 40 lb. silage per day for each cow.

Source: Portland Cement Co.

This material is based on factual information believed to be accurate but is not guaranteed.
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THE FARM SILO

A 1,200 lb. cow normally eats about 40 lbs. of corn silage a day. Yearlings eat about 20 lbs; fattening cattle, about 25 to 35 lbs. for each 1000 lbs. of weight. A sheep takes about 3 or 4 lbs; a work horse, 15 to 20 lbs. daily. Grass silage can be fed to dairy cows in approximately the same amount as corn silage.

SILO CONSTRUCTION

Silage is much more compact and heavier as the depth from the surface increases. The weight per cubic foot at any depth will vary considerably, depending upon the percentage of water in the crop when ensiled and the amount of grain in it.

Any common type of silo that is in good condition may be filled with grass silage. However, silos used for grass silage must be even more airtight than for corn silage. The pressure on the silo wall is about twice as much as with corn silage; therefore, silos built for corn silage should not be filled over half full with grass silage unless additional steel reinforcing bands are placed around the silo. The addition of one nine-sixteenth-inch round rod for each present rod or hoop will usually supply sufficient extra strength for grass silage.

New silos should be built with the extra strength if there is any likelihood that they will be filled with grass silage.

TRENCH SILOS

To calculate the capacity of a trench silo, multiply the average width in feet by the depth in feet to get the cross-sectional area and then multiply by the length to get the volume. To avoid spoilage, the cross sectional width of a trench silo should be small enough so that your herd will eat a one foot slice of silage per day.

For example, a silo 8 feet wide at the bottom, 12 feet wide at the top, and 8 feet deep has a cross sectional area of 80 feet.

$$\frac{(8+12)}{2} \times 8 = 80$$

If the ensilage weighs 35 pounds average per cubic foot, this trench will hold 35 x 80 or 2,800 pounds (1.4 tons) for each foot in length.

Most trench silos used on average farms have a capacity of from $1\frac{1}{2}$ to 2 tons per foot in length of the trench proper, not including the runways.

The capacities of silo runways of three different lengths are figured separately from the trench proper because the ensilage, being less tightly packed, usually weighs at least 30 per cent less than that in the main body of the silo. These capacities have been computed separately for each size of silo listed.

CAPACITIES OF TRENCH SILOS IN TONS

Cross-Sectional Dimensions in Feet			Body of Trench Length in Feet							Sloping Runway Length in Feet		
Depth	Top Width	Bottom Width	20	30	40	50	60	70	80*	15	20	25
			Ensilage Weight—35 Pounds per Cu. Ft.									
6	8	6	14.7	22.0	29.4	36.8	44.1	51.4	58.8	3.6	4.9	6.1
6	10	7	17.8	26.8	35.7	44.6	53.6	62.5	71.4	4.4	5.9	7.4
6	12	8	21.0	31.5	42.0	52.5	63.0	73.5	84.0	5.3	7.0	8.7
7	8	6	17.1	25.7	34.3	42.9	51.5	60.0	68.6	4.3	5.7	7.1
7	10	7	20.8	31.2	41.7	52.1	62.5	72.9	83.4	5.2	6.9	8.6
7	12	8	24.5	36.7	49.0	61.3	73.5	85.7	98.0	6.1	8.2	10.2
8	10	6	22.4	33.6	44.8	56.0	67.2	78.4	89.6	5.6	7.5	9.3
8	12	8	28.0	42.0	56.0	70.0	84.0	98.0	112.0	7.0	9.3	11.6
8	14	10	33.6	50.4	67.2	84.0	100.8	117.6	134.4	8.4	11.2	14.0

*To obtain capacities of trench silos which are longer than 80 feet, simply multiply the tonnages given in the tables by a factor of the length.

EXAMPLE: The capacity of a trench silo 8' x 8' x 12' and 100' long would be:
Tonnage in 50-foot trench x 2 = tonnage in 100-foot trench.
Source: John Deere, Co. 70 tons x 2 = 140 tons

DETERMINING AMOUNT OF HAY IN BARNS AND STACKS

TABLE 1
CUBIC FEET PER TON OF HAY

	Settled 1 to 2 mo.	*Settled over 3 mo.*
	cu. ft.	*cu. ft.*
Timothy	640	625
Wild Hay	600	450
Alfalfa	485	470
Clover	512	500
Chopped Hay	225	210
Baled Hay (closely stacked)	150–200	150–200
Straw—Baled	200	200
Straw—Loose	1000	600–1000

Source: Doane Farm Book

Hay in Barns
Multiply the width by the length by the height, of hay in the barn, all in feet, and divide by the cubic feet per ton shown in Table 1 to determine the total tons of hay in the barn.

Hay in Stacks
Three types of stacks are shown with a rule for determining cubic feet content of each type:

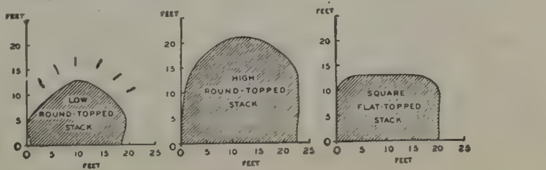
For low, round-topped stacks [(.52 times over-throw in feet) minus (.44 times width in feet)] times width in feet times length in feet equals cubic feet of hay in stack. (Overthrow is the distance from the ground on one side, up and over the stack and down to the ground on the other side.)

How to figure if overthrow is 40 feet and base is 20 feet and length 30 feet.

(.52 x 40) - (.44 x 20) x 30 = 36,000 cu. ft.

For high, round-topped stacks [(.52 times overthrow in feet) minus (.46 times width in feet)] times width in feet times length in feet equals cubic feet of hay in stack.

For square, flat-topped stacks [(.56 times overthrow in feet) minus (.55 times width in feet)] times width in feet times length in feet equals cubic feet of hay in stack.



Cross sections of typical oblong stacks

The cubic feet of hay in the stack as calculated above, divided by the cubic feet per ton as shown in Table 1 equals total tons of hay in the stack.

MEASURING HAY IN STACKS

Oblong or Rectangular Stacks

The volume of a rectangular stack is equal to its length multiplied by the area of the cross section. The length can be measured easily, but the exact area of the cross section is not determined so readily because an accurate formula is necessary for computing the area from the two measurements—width and over—that are usually made for this purpose. The width and over measurements are made easily and for this reason those who buy and sell hay by measure use rules that require only three measurements, namely, width, length, and over. Width is the width of the stack at the ground; length is the average length of the stack; and over is the distance from the ground on one side over the stack to the ground on the other side.

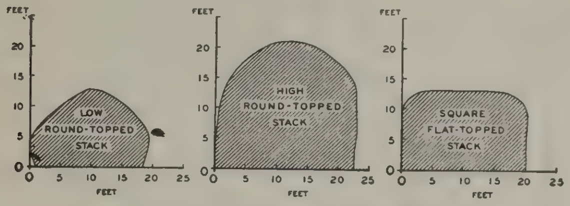


FIGURE 1.—Cross sections of typical oblong stacks

The three types of stacks (fig. 1), with the rule for each type, are as follows:

For low, round-topped stacks $(0.52 \times O) - (0.44 \times W) \times WL$.
For high, round-topped stacks $(0.52 \times O) - (0.46 \times W) \times WL$.
For square, flat-topped stacks $(0.56 \times O) - (0.55 \times W) \times WL$.

In these rules O equals the over, W equals the width, and L equals the length.

EXAMPLE

To determine the volume of a rectangular stack of the high, round-topped type that is 20 feet wide, 45 feet over, and 50 feet long.
Volume $= (0.52 \times 45) - (0.46 \times 20) \times (20 \times 50)$.

$$\begin{array}{r}45\\0.52\\\hline 90\\225\\\hline 23.40\\-9.20\\\hline 14.20\\1,000\\\hline\end{array}\qquad\begin{array}{r}20\\0.46\\\hline 9.20\end{array}\qquad\begin{array}{r}50\\20\\\hline 1,000\end{array}$$

14,200.00 cubic feet in the stack.

These three types of stacks are typical of the oblong stacks built in different parts of the United States. The square, flat-topped stacks are found principally in the Sacramento and San Joaquin Valleys of California; the high, round-topped stacks are common in the intermountain States of Utah, Nevada, and Idaho; and the low, round-topped stacks are the type built in the Great Plains States where the overshot stacker is used.

U. S. DEPARTMENT OF AGRICULTURE

Round Stacks

A simple rule or formula, similar to the ones given for oblong stacks, could not be developed, but Table 1 gives the volume of round stacks when the circumference is between 45 and 98 feet and the over between 25 and 50 feet. The volume of stacks having circumferences or overs greater or less than those given in Table 1 can be calculated by using the formula: Volume $= (0.04 \times O) - (0.012 \times C)C^2$. In this formula C equals the circumference or distance around the stack at the ground and O equals the over or distance from the ground on one side over the peak to the ground on the other side. Usually it is advisable to take two over measurements at right angles to each other, and to average them. (See Table I on next page)

EXAMPLE

To determine the volume of a round stack that is 100 feet in circumference and has an average over of 60 feet.
Volume $= (0.04 \times 60) - (0.012 \times 100) \times (100)^2$.

$$\begin{array}{r}60\\0.04\\\hline 2.40\\-1.20\\\hline 1.20\\10,000\\\hline\end{array}\qquad\begin{array}{r}100\\0.012\\\hline 200\\100\\\hline 1.200\end{array}\qquad\begin{array}{r}100\\100\\\hline 10,000\end{array}$$

12,000.00 cubic feet in the round stack.

Volumes given in the table or determined from the formula will, on the average, amount to the actual volume of the stacks and in most individual cases the volume will not vary more than 10 per cent from the actual volume.

Cubic Feet Per Ton

Many factors affect the density of hay in the stack and therefore the number of cubic feet required for a ton of hay. The factor that causes the greatest variation is probably moisture in the hay at stacking time. Tough or slightly undercured hay will settle and become more compact than very dry or overcured hay. Other factors like texture and foreign material may affect the density also, but probably not to the same extent as moisture. For these reasons there is often a considerable difference in the number of cubic feet required for a ton in different stacks, and, at present, there are no simple methods for measuring variations in density.

The following figures, which are the averages obtained from a large number of stacks, can be used with fairly good results:

Kind of hay	Length of time in stack	
	30 to 90 days	Over 90 days
Alfalfa	485 cubic feet per ton	470 cubic feet per ton.
Timothy and timothy mixed	640 cubic feet per ton	625 cubic feet per ton.
Wild	600 cubic feet per ton	450 cubic feet per ton

When these figures are used with the rules for determining volume herein recommended more accurate results will be obtained than if such rules as the Frye-Bruhn or Quartermaster rules are used with such figures for cubic feet per ton as have been in common use heretofore.

HAY IN BARN—It requires from 400 to 500 cubic feet for storing 1 ton of hay in a mow. The variation depends largely upon the height of the mow and whether the hay is well settled and packed. The kind of hay and moisture content are also considerations.

The cubic feet per ton figures shown in the above table for hay in stack can be used as approximately correct for various kinds of hay in a mow. In addition, the following are suggested:

Clover Hay 500 cubic feet
Straw 600 to 1000 cubic feet

Table I.— *Volume of round stacks of hay of specified dimensions*

Circumference (feet)	Indicated volume in cubic feet when the over is—													[Volume figures given to the nearest 5]												
	25 feet	26 feet	27 feet	28 feet	29 feet	30 feet	31 feet	32 feet	33 feet	34 feet	35 feet	36 feet	37 feet	38 feet	39 feet	40 feet	41 feet	42 feet	43 feet	44 feet	45 feet	46 feet	47 feet	48 feet	49 feet	50 feet
45	825	960	1,090																							
46	840	975	1,105	1,235																						
47	855	990	1,120	1,250	1,385	1,505																				
48	870	1,005	1,135	1,265	1,400	1,525	1,650	1,785																		
49	885	1,020	1,150	1,285	1,420	1,540	1,670	1,805	1,935																	
50	900	1,035	1,165	1,300	1,435	1,560	1,690	1,825	1,955	2,090	2,215															
51	915	1,050	1,180	1,315	1,450	1,580	1,710	1,845	1,980	2,110	2,240	2,370	2,495													
52	930	1,065	1,200	1,330	1,465	1,600	1,730	1,865	2,000	2,130	2,265	2,400	2,530	2,665	2,795											
53	945	1,080	1,215	1,345	1,485	1,615	1,750	1,880	2,020	2,155	2,290	2,430	2,560	2,700	2,835	2,975										
54	960	1,095	1,230	1,360	1,500	1,630	1,770	1,900	2,040	2,180	2,320	2,460	2,595	2,735	2,875	3,015	3,160									
55	975	1,110	1,245	1,380	1,515	1,650	1,790	1,920	2,065	2,205	2,345	2,490	2,630	2,770	2,915	3,060	3,210	3,360	3,505							
56	990	1,125	1,260	1,395	1,530	1,665	1,810	1,940	2,085	2,230	2,375	2,520	2,660	2,805	2,955	3,105	3,255	3,415	3,565	3,720						
57	1,005	1,140	1,275	1,410	1,550	1,685	1,830	1,960	2,105	2,250	2,400	2,545	2,695	2,845	2,995	3,150	3,305	3,465	3,625	3,785	3,940					
58	1,020	1,155	1,290	1,435	1,565	1,705	1,850	1,980	2,125	2,275	2,425	2,575	2,725	2,880	3,035	3,195	3,350	3,515	3,680	3,850	4,010	4,175				
59	1,035	1,170	1,310	1,450	1,580	1,720	1,865	2,000	2,150	2,300	2,455	2,605	2,755	2,915	3,075	3,235	3,400	3,570	3,740	3,915	4,080	4,245	4,415			
60	1,050	1,185	1,325	1,465	1,600	1,740	1,885	2,020	2,170	2,325	2,480	2,635	2,790	2,950	3,115	3,280	3,445	3,625	3,795	3,975	4,150	4,320	4,490	4,670		
61	1,065	1,200	1,340	1,485	1,615	1,760	1,905	2,040	2,195	2,345	2,510	2,665	2,825	2,985	3,155	3,325	3,495	3,675	3,855	4,040	4,215	4,390	4,570	4,750	4,925	
62	1,080	1,215	1,355	1,500	1,635	1,775	1,925	2,060	2,215	2,365	2,535	2,695	2,855	3,020	3,195	3,365	3,540	3,730	3,915	4,105	4,285	4,465	4,650	4,830	5,015	5,200
63	1,095	1,230	1,370	1,515	1,655	1,795	1,945	2,080	2,235	2,390	2,560	2,725	2,890	3,055	3,235	3,410	3,585	3,780	3,970	4,165	4,355	4,540	4,730	4,910	5,105	5,295
64	1,110	1,245	1,385	1,530	1,670	1,810	1,960	2,100	2,260	2,415	2,585	2,755	2,920	3,090	3,275	3,455	3,635	3,835	4,030	4,230	4,425	4,615	4,805	4,995	5,195	5,390
65	1,125	1,260	1,400	1,545	1,685	1,830	1,980	2,120	2,280	2,440	2,615	2,780	2,950	3,125	3,315	3,495	3,680	3,885	4,085	4,290	4,490	4,690	4,885	5,075	5,285	5,485
66	1,140	1,275	1,420	1,560	1,705	1,850	2,000	2,140	2,300	2,465	2,640	2,810	2,985	3,160	3,355	3,540	3,730	3,935	4,145	4,355	4,560	4,760	4,960	5,160	5,370	5,580
67	1,155	1,290	1,435	1,575	1,720	1,865	2,020	2,160	2,325	2,485	2,665	2,840	3,015	3,195	3,395	3,585	3,780	3,990	4,205	4,420	4,630	4,830	5,040	5,245	5,460	5,670
68	1,170	1,305	1,450	1,595	1,740	1,885	2,040	2,180	2,345	2,510	2,690	2,870	3,050	3,230	3,430	3,630	3,825	4,045	4,265	4,485	4,695	4,900	5,120	5,330	5,550	5,765
69	1,185	1,320	1,465	1,610	1,755	1,905	2,055	2,200	2,365	2,530	2,715	2,900	3,080	3,265	3,470	3,670	3,875	4,095	4,320	4,545	4,760	4,970	5,195	5,415	5,640	5,860
70	1,200	1,335	1,480	1,625	1,770	1,925	2,075	2,220	2,385	2,555	2,745	2,930	3,115	3,300	3,510	3,715	3,920	4,150	4,375	4,610	4,825	5,045	5,275	5,495	5,730	5,955
71	1,215	1,350	1,495	1,640	1,790	1,940	2,095	2,240	2,405	2,580	2,770	2,960	3,145	3,335	3,550	3,760	3,970	4,205	4,435	4,670	4,895	5,120	5,355	5,580	5,820	6,050
72	1,230	1,365	1,515	1,660	1,805	1,960	2,115	2,260	2,430	2,605	2,795	2,990	3,175	3,375	3,590	3,805	4,015	4,255	4,495	4,735	4,965	5,195	5,435	5,665	5,910	6,145
73	1,245	1,380	1,530	1,675	1,820	1,975	2,135	2,280	2,450	2,625	2,825	3,015	3,210	3,410	3,630	3,845	4,065	4,310	4,550	4,795	5,030	5,270	5,515	5,750	6,000	6,240
74	1,260	1,395	1,545	1,690	1,840	1,995	2,150	2,300	2,470	2,650	2,850	3,045	3,245	3,445	3,665	3,890	4,110	4,360	4,610	4,855	5,095	5,340	5,595	5,835	6,090	6,335
75		1,410	1,560	1,705	1,855	2,010	2,170	2,320	2,495	2,675	2,875	3,075	3,275	3,480	3,705	3,935	4,160	4,415	4,670	4,915	5,165	5,415	5,675	5,915	6,180	6,430
76		1,425	1,575	1,725	1,870	2,030	2,190	2,340	2,515	2,695	2,905	3,105	3,310	3,515	3,745	3,975	4,205	4,435	4,725	4,980	5,235	5,490	5,750	6,000	6,270	6,525
77			1,590	1,740	1,890	2,050	2,210	2,360	2,540	2,720	2,930	3,135	3,340	3,550	3,785	4,020	4,250	4,520	4,785	5,045	5,305	5,560	5,830	6,085	6,355	6,620
78			1,605	1,755	1,905	2,070	2,230	2,380	2,560	2,745	2,955	3,165	3,375	3,585	3,825	4,065	4,300	4,570	4,840	5,105	5,370	5,635	5,910	6,170	6,445	6,715
79				1,775	1,925	2,090	2,250	2,400	2,580	2,765	2,980	3,195	3,405	3,620	3,865	4,105	4,345	4,625	4,895	5,170	5,440	5,710	5,990	6,255	6,535	6,810
80				1,790	1,945	2,105	2,270	2,420	2,605	2,790	3,010	3,225	3,440	3,655	3,905	4,150	4,395	4,675	4,955	5,235	5,510	5,785	6,070	6,340	6,625	6,905
81				1,805	1,960	2,125	2,285	2,440	2,625	2,815	3,035	3,255	3,470	3,690	3,945	4,195	4,440	4,730	5,010	5,295	5,575	5,855	6,145	6,425	6,715	7,000
82				1,820	1,975	2,145	2,305	2,460	2,645	2,835	3,060	3,280	3,500	3,725	3,985	4,240	4,490	4,785	5,070	5,360	5,645	5,930	6,225	6,510	6,800	7,090
83					1,995	2,160	2,325	2,480	2,665	2,860	3,090	3,310	3,535	3,760	4,025	4,280	4,535	4,830	5,130	5,425	5,715	6,005	6,305	6,595	6,890	7,185
84						2,180	2,345	2,500	2,690	2,880	3,115	3,340	3,570	3,795	4,065	4,325	4,580	4,885	5,190	5,485	5,785	6,080	6,385	6,675	6,980	7,280
85								2,520	2,710	2,905	3,140	3,370	3,600	3,830	4,105	4,365	4,630	4,935	5,245	5,550	5,850	6,155	6,465	6,760	7,070	7,375
86									2,735	2,930	3,170	3,400	3,635	3,865	4,145	4,410	4,675	4,990	5,300	5,615	5,920	6,230	6,545	6,845	7,160	7,470
87											3,195	3,430	3,665	3,900	4,185	4,455	4,725	5,040	5,360	5,680	5,990	6,300	6,620	6,930	7,250	7,565
88												3,460	3,700	3,940	4,220	4,500	4,770	5,090	5,420	5,745	6,060	6,375	6,700	7,015	7,340	7,660
89												3,490	3,730	3,975	4,260	4,540	4,815	5,145	5,475	5,805	6,125	6,450	6,780	7,100	7,430	7,755
90													3,765	4,010	4,300	4,585	4,860	5,200	5,535	5,865	6,195	6,525	6,860	7,185	7,520	7,845
91														4,045	4,340	4,630	4,910	5,250	5,595	5,930	6,265	6,600	6,940	7,270	7,605	7,940
92														4,080	4,380	4,670	4,955	5,305	5,650	5,995	6,335	6,675	7,020	7,355	7,695	8,035
93															4,420	4,715	5,005	5,360	5,710	6,055	6,400	6,750	7,095	7,440	7,785	8,130
94															4,460	4,760	5,050	5,410	5,765	6,120	6,470	6,825	7,175	7,525	7,875	8,225
95																4,805	5,100	5,465	5,825	6,180	6,540	6,895	7,255	7,610	7,965	8,320
96																	5,150	5,515	5,885	6,245	6,610	6,970	7,335	7,695	8,055	8,415
97																	5,195	5,570	5,945	6,310	6,680	7,045	7,415	7,780	8,145	8,510
98																		5,625	6,000	6,370	6,750	7,120	7,495	7,865	8,235	8,605

CAPACITIES OF SILOS

TRENCH SILO *Kansas*

Ordinarily, dairy cows are fed about 40 pounds of silage a day, with young stock receiving less. For an average herd, an estimate of 1 cubic foot of silage a head a day may be used in determining the size of the silo needed. For small herds, the trench should be made narrow to permit the silage to be fed rapidly enough to avoid spoilage.

To compute the capacity of any trench silo, first figure the cubic feet in one foot of length by multiplying the average width by the depth. Here is an example: For a silo with a top width of 12 feet, a bottom width of 8 feet, and a depth of 8 feet, multiply half the sum of the top and bottom widths, which is 10 feet, by the depth of 8 feet. This will give 80 cubic feet per foot of length. Thus, the capacity of a silo 40 feet long would be 80 × 40, or 3,200 cubic feet. If the trench has one or both ends sloping, include only half the lengths of the slopes. To determine the capacity in pounds, multiply the cubic feet by 35. Thus, the silo with dimensions as given above will hold 3,200 × 35, equalling 112,000 pounds, or 56 tons. For a convenient approximate rule, divide the cubic feet by 60 to determine the capacity in tons.

Capacity of silo in cubic feet and in pounds per foot of length of settled silage.*

Average width, feet.	Depth of silo in feet.									
	6		7		8		9		10	
	Cu. ft.	Lbs.	Cu. ft	Lbs.	Cu. ft.	Lbs.	Cu. ft.	Lbs.	Cu. ft.	Lbs.
8	48	1,680	56	1,960	64	2,240	72	2,520	80	2,800
9	54	1,890	63	2,205	72	2,520	81	2,835	90	3,150
10	60	2,100	70	2,450	80	2,800	90	3,150	100	3,500
11	66	2,310	77	2,695	88	3,080	99	3,465	110	3,850
12	72	2,520	84	2,940	96	3,360	108	3.780	120	4,200

* Silage weight figured at 35 pounds per cubic foot.

Capacity of round silos (Nebraska)

Height (feet)	Inside diameter					
	10 feet	12 feet	14 feet	16 feet	18 feet	20 feet
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
20	22.78	32.75	44.60	58.28	73.80	91.10
24	29.50	42.46	57.80	75.48	95.53	117.96
26	33.08	47.66	64.80	84.64	107.22	132.30
28	36.78	53.00	72.10	94.10	119.26	147.10
30	40.60	58.50	79.50	103.80	131.60	162.30
32		64.12	87.20	113.80	144.35	178.00
34		69.82	95.10	124.20	157.35	194.10
36			103.20	134.70	170.70	210.60
38			111.30	145.30	184.20	227.20
40			119.60	156.20	198.10	244.30
44				178.60	226.30	279.10
48				201.80	255.65	315.40

Feeding capacities of silos (Iowa)

Inside diameter of silo (feet)	Silage in depth of 2 inches	Number of animals that may be fed, allowing daily—				
		40 pounds per head	30 pounds per head	20 pounds per head	10 pounds per head	4 pounds per head
	Pounds					
10	524	13	17	26	52	130
12	754	19	25	37	76	190
14	1,026	25	34	51	100	250
16	1,340	33	44	67	132	330
18	1,696	42	56	85	168	420
20	2,094	52	70	104	208	520

AMOUNTS OF SILAGE COMMONLY FED PER HEAD DAILY.

Dairy Cows, in milk	30 to 50 lbs.
Dry cows, somewhat less	
Dairy heifers	12 to 20 lbs.
Beef breeding cows	30 to 50 lbs.
Fattening 2-year-old steers:	
First part of fattening period	30 to 40 lbs.
Decrease as feeding progress to about	10 to 15 lbs.
Brood mares and idle horses	10 to 15 lbs.
Breeding ewes	2 lbs.
(Sometimes as much as 3 or 4 lbs. is safely fed.)	
Fattening lambs	1.5 to 3 lbs

North Dakota

FEED REQUIREMENTS OF LIVESTOCK

The amounts of feed listed in the following standards of feed requirements are for livestock receiving better-than-average care and management.

One pasture-day (a measure of pasture consumption occurring in several of the feed standards) refers to the amount of pasture consumed in one day by one "animal unit" receiving no other feed. An "animal unit" is one mature horse or cow or the equivalent in other grazing animals:

1 horse
2 colts under two years old
1 cow or mature bull
2 yearling cattle
2 weaned calves
3 cattle on feed
5 mature sheep
10 weaned lambs
15 spring or summer pigs

More protein concentrate than the amounts listed will be required if *low* protein concentrate is fed.

Horses

Feed for 1 horse or mule (or 2 colts under two years old) for 1 year:

Corn	20 bushels
Oats	35 bushels
Hay	1½ tons
Other roughage	1 ton
Pasture	160 pasture-days

Beef cattle

Beef breeding herd—Quantities listed are for 1 animal for 1 year.

Kind	Without silage					With silage					
	Corn	Oats	Legume hay	Other roughage	Pasture-days[a]	Corn	Oats	Silage	Legume hay	Other roughage	Pasture-days[a]
	bu.	*bu.*	*tons*	*tons*		*bu.*	*bu.*	*tons*	*tons*	*tons*	
Cow	..	..	¾	1½	180	..	..	2	½	½	180
Bull, mature	10	10	2	...	180	10	10	1½	1½	...	180
Heifer, yearling	5	8	1½	...	90	5	8	2	½	...	90
Calf, to 1 year	4	4	1	...	60	4	4	½	¾	...	60

[a] In addition to pasturage obtained from stalk fields.

Fat calves—Quantities listed are for 1 unweaned calf to be marketed at about 10 months of age, weighing from 650 to 700 pounds:

Corn	20 bushels
Hay	125 pounds
Protein concentrate	75 pounds

Feeding cattle—Quantities listed are for 1 animal for the gain indicated.

Kind of cattle and starting weight	Gain	Without silage				With silage				
		Corn	Protein concentrate	Legume hay	Pasture-days	Corn	Protein concentrate	Silage	Hay	Pasture-days
Fed in drylot	*lb.*	*bu.*	*lb.*	*tons*		*bu.*	*lb.*	*tons*	*tons*	
Steer calves, under 500 lb.	500	55	225	¾	...	50	350	1¼	¼	...
Heifer calves, under 500 lb.	350	40	150	½	...	35	200	¾	¼	...
Yearling steers, 500 to 750 lb.	400	50	100	¾	...	40	200	1¼	¼	...
Yearling heifers, 500 to 600 lb.	250	30	75	½	...	25	150	¾	¼	...
2-year-old steers (medium grade) over 750 lb.	250	30	50	¾	...	15	150	2½	¼	...
Wintered largely on roughage; grain fed on pasture										
Steer calves, under 500 lb.	500	45	150	¾	50	35	250	1¾	¼	50
Heifer calves, under 500 lb.	350	30	100	¾	40	20	200	1¾	¼	40
Yearling steers, 500 to 750 lb.	400	40	100	1½	50	30	200	2½	½	40

Hogs

Feed required for 1 hog to a market weight of 225 pounds, including prorata share of feed for breeding stock.

	Corn	Oats	Protein concentrate	Alfalfa	Pasture-days
	bu.	*bu.*	*lb.*	*lb.*	
Spring and summer pigs	15	2	70	4	10
Fall and winter pigs	16	3	90	40	...

University of Illinois

LOT REQUIREMENTS AND FEED SAVED BY HOGS

(Feed Requirements Continued) **Dairy cattle**

Average of all breeds, assuming liberal use of good pasture. The quantities listed are for 1 animal for 1 year.

Class of cattle and production of milk (pounds)	Without silage[a]					With silage[a]					
	Corn	Oats	Protein concentrate	Legume hay	Pasture-days	Corn	Oats	Protein concentrate	Silage	Legume hay	Pasture-days
Cow	*bu.*	*bu.*	*lb.*	*tons*		*bu.*	*bu.*	*lb.*	*tons*	*tons*	
Under 6000	22	23	160	2½	180	13	21	225	3	1¾	180
6000 to 6999	24	28	200	2½	180	15	23	300	3	1¾	180
7000 to 7999	27	30	240	2½	180	17	25	375	3	1¾	180
8000 to 8999	29	32	275	2½	180	19	27	450	3	1¾	180
9000 to 9999	30	34	320	2½	180	21	29	575	3	1¾	180
10000 and over	32	36	370	2½	180	28	33	625	3	1¾	180
Bull, mature	12	12	150	2½	180	12	12	250	1½	1¾	180
Heifer, yearling	9	9	100	2	90	8	8	160	1	1¾	90
Calf, to 1 year[b]	5	5	60	1	60	5	5	100	½	¾	60

[a] The quantities of feed for dairy cows without silage were taken from dairy herd-improvement association records for 605 cows, 1936-1938, while the quantities of feeds for dairy cows with silage were taken from dairy cost records for approximately 5000 cows, 1936, 1937, and 1938. Dairy cows will require larger amounts of protein concentrates unless legume hay of good quality is fed.

[b] In addition to 200 pounds whole milk and 1200 pounds skim milk, or 800 pounds whole milk.

Sheep

The quantities listed are for 1 animal for 1 year, or for the gain or age indicated.

Kind of sheep	Corn	Oats	Protein concentrate	Legume hay	Pasture-days
	bu.	*bu.*	*lb.*	*tons*	
Breeding ewes and rams	1	2	...	¼	36
Early native lambs, to market at 4-6 months	¾	1	20	1/20	...
Western lambs, 20-30 lb. gain per head fed on pasture	1	2	...	1/40	9
Western lambs, 20-30 lb. gain per head fed in drylót	2	1	...	3/40	...

Poultry

The quantities listed are for 100 birds for the period indicated.

Kind of poultry and feeding period	Corn	Oats	Wheat	Protein concentrate	Alfalfa meal
	bu.	*bu.*	*bu.*	*lb.*	*lb.*
Chicken hens, for 1 year	64	56	32	800	...
Pullets, to laying age	18	19	8½	375	...
Chicks, to 12-16 weeks	7	6	3½	200	...
Turkeys, to market age (24 weeks, semi-range)	32	35	16	1250	500

WINTER SHELTER AND LOT SPACE FOR LIVESTOCK

Kind of livestock	Kind of space	Amount of space (square feet per head)
Feeder calves, under 600 pounds	Shed	25 to 30
	Lot (paved)	30 to 35
Feeder cattle, yearlings and older	Shed	30 to 35
	Lot (paved)	35 to 40
Beef breeding cows (calving in February)	Shed	40 to 60
Hogs	Shed	6 to 8
	Feeding floor	8 to 10
Feeder lambs	Shed	6 to 8
	Lot	6 to 8
Ewes (lambs in February and March)	Shed	12 to 15
Hens	House	3 to 4

CORN SAVED BY HOGS FOLLOWING FEEDING CATTLE

	Percent of corn saved	Pounds pork per bushel of corn fed to cattle
Shock corn	20	2
Ear corn	15	1½
Shelled corn	10	1

University of Illinois

DOANE AGRICULTURAL DIGEST 1939

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

HOW TO KEEP FARM ACCOUNT BOOKS

A set of simple account books is most practical for the majority of farmers. Only three types of records need to be kept;

1. Income and expense records;
2. A yearly inventory of what you own and what you owe;
3. Acreages, yields and other incidental records that explain facts back of the sales, changes in inventory and other financial transactions.

A more elaborate system adds to the work but, in return, will yield more information if you take time to analyze the data and accounts.

Good bookkeeping means simply writing down in logical order facts and figures relative to the farm business as they occur. Complete records not only supply the data for preparing income tax returns but form the basis for more effective farm planning and are valuable in preparing credit reports.

INCOME AND EXPENSE RECORD

A record of cash income and expense is essential to any type of business. Without it, it is difficult to prepare an accurate statement of income for tax purposes. To be effective, the book entries should record not only the amount of the transaction but the source of the income or purpose of the expense as the case may be.

Simple cash books showing income and expense in chronological order are inadequate for farm purposes. A many-column Journal or Ledger is best.

MANY-COLUMN JOURNAL --Most farmers find a journal-type book with a number of appropriate columns easier to set up and use than any other type. Forms for this type of book are available from many sources, but a bound notebook, ruled to fit the specific needs, will meet the requirements. The 8-column journal illustrated below was made up for dairy farms. Different column headings should be used by other farmers depending on the type of products sold.

The strong features of this type of record are that they are easy to keep and all cash received or paid out is summarized when the columns are added.

LEDGER --For those who need more complete records, a set of ledger-type books may be more acceptable. Ledger-type books are broken down by enterprises and ruled to show income and expense in parallel columns. With this system, all cash transactions to date relative to a particular enterprise can be summarized quickly.

Ledger-Type Page - **CATTLE**

1943	Expenses		1943	Receipts	
	Item	Amount		Item	Amount
Jan. 5	D. H. I. A. 18 cows @ 3.00, 6 mos.	$54.00	Jan.	Calves of Nos. 35-36	$14.00
			Feb. 26	No. 13's calf	4.00
Jan. 27	Dehorning bull	1.50	Mar. 2	Fat calf to Brown	14.50
Feb. 15	Salve	.50	Mar. 3	Sold No. 13 to Co-op	50.00
Feb. 20	Epsom salts	.75	Mar.	3 calves (Nos. [illegible]-22-[illegible])	19.50
Feb. 25	Dr. H., 2 visits	5.00	Apr.	3 calves (Nos. 35, 33, 34)	21.00
Mar. 5	Grinding feed	3.15	May 27	No. 4 to C. D.	85.00
Apr. 6	Cow salt 500 pounds	7.28	June 18	No. 16's calf	6.00
May 16	2 gallons cow spray	2.38	Aug. 10	Sold No. 28 to J. A.	75.00
June 18	Dr. L., 3 visits	7.50	Aug. 30	Sold No. 6 to A. B.	100.00
June 20	Cow Ease	1.40	Oct. 15	2 calves (Nos. 40, 29)	14.00
July 5	Bal. of D. H. I. A. bill	54.00	Dec. 6	Calf (No. 41)	5.50
Aug. 17	Grinding feed	3.45			
Sept. 3	2 halters	1.50		Total sales of cattle	413.50
Oct. 6	T. B. test, all cows	36.00			
Nov. 30	Grinding feed	3.75	Year	Milk sold (from table 4)	3,281.85
	Total	182.16		Total of direct receipts [3]	3,695.85
Year	From table 4:		Year		
	Hauling 100,000 pounds sold.	150.00		Value of milk used by family (from table 4)	95.36
	Advertising	100.00	Dec. 31	Increase in value of herd (from cattle inventory page)	
	Can service	50.00			30.00
Year	Feed bought (from feed page).	408.00			[4] 3,820.71
	Total of direct expenses	[2] 890.16			
Dec. 31	Balance	[4] 2,930.55			
		3,820.71			

Ledger-type records are harder to keep than a journal. They have the advantage of making cost studies by enterprises easier.

ANNUAL INVENTORY

The annual inventory describes and values all that you own (assets) and all that you owe (liabilities) as of a particular date--usually December 31 or January 1. The difference shows the net financial changes occurring during the year as expressed in terms of net worth.

The first listing of property for the annual inventory is most difficult. Two persons should work together. Let the operator describe and value the property under consideration while the other records the data in a notebook. Go into every building and check all lots and fields to be sure that nothing is overlooked. List items separately. It is not necessary to break the list down into groups as you go around. This can be done later more effectively. Five and ten-year inventory blanks that require only one listing may be secured from the Extension Service at the State College, or purchased from commercial agencies.

(Continued on back)

Month March 1943 Many-Column Journal Type Page for Farm **INCOME**

Day	Items	Quantity	Milk or butterfat	Dairy cattle	Other livestock	Poultry and eggs	Crops sold	Outside work		Other receipts
2	Veal calf to Brown			$14.50						
3	Eggs	60 dozen				$21.00				
7	Potatoes to general store	10 bushels					$11.50			
10	February milk	7,540 pounds	$238.26							
11	Town warrant (road work)							$6.00		
14	Hay for Clarence	1 load					16.00			
17	Eggs	60 dozen				20.00				

Month March 1943 Many-Column Journal Type Page for Farm **EXPENSES**

Day	Items	Quantity	Labor hired	Feeds bought	Farm improvements and repairs[2]	Mach. and equipment bought, repairs, oil and gas [2]	Livestock bought and expenses [2]	Crop expenses	House	Other expenses
1	Sarah, for house								$40.00	
3	Dairy ration	1 ton		$60.00						
	Corn for hogs	36 bushels		47.50						
	Oats for horses	50 bushels		49.50						
10	Hauling February milk						$11.31			
	Deduct for advertising						7.54			
	Deduct for butter and cheese								4.50	
	Dr. Page (cow)						3.00			
13	Bal. income tax									$39.68
	Gasoline (Feb.)	35 gal.				$7.14				
	Coal for brooder	¼ ton					6.75			
	Fertilizer	3 ton						$105.00		

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[2] These columns should be read through at the end of the year to figure the amount of capital items for making up the property list.

Illustrations from Farmers' Bulletin No. 1962.

HOW TO KEEP FARM ACCOUNT BOOKS

Annual Inventory - **SUMMARY**

Item	Inventory value		Change in value	
	Jan. 1	Dec. 31	Increase	Decrease
Real estate	$8,296	$8,263		$33
Machinery and equipment	1,021	970		51
Livestock:				
Cattle	1,600	1,630	$30	
Hogs	50	50		
Hens	100	100		
Work stock	360	330		30
Feed and supplies	237	268	31	
Total physical assets	11,664	11,611	61	114
Net change				53
Accounts receivable	225	275	50	
Cash (in bank and at home)	161	111		50
Total investment (assets)	12,050	11,997	(111)	(164)
Accounts payable	343	127		
Farmer's net worth	11,707	11,870	163	

Proper listing cannot be over-emphasized. For example, an operator might have an old tractor worth $200 and a new tractor worth $1100. It is wrong simply to list tractors--$1300. They should be shown as two separate items so they can be depreciated and dealt with separately in the future. After the list is completed the first time, the operator should be able to check it quickly by himself in succeeding years unless major changes occur.

The inventory value of farm property is determined by one of these methods:

1. Cost, less observed depreciation and obsolescence.
2. Present market value.
3. Value to the farm based either on service or replacement costs.

Any one of these methods may be used but the important thing is to set a value that reflects the operator's opinion of the value of the property involved. It matters little what someone else thinks of the value unless the property is to be sold or traded soon.

Annual Inventory -**6-YEAR LISTING**

Crop equipment

Item	Bought		1943	1944	1945	1946	1947	1948
	Year	Price						
Tractor	1941	$1,400	$1,010	$850				
2-bottom plow	1937	110	39	33				
8-foot tandem disk	1939	130	65	55				
4-section spring tooth	1933	75	13	11				
6-section harrow	1935	40	10	9				
8-foot packer	1936	135	40	33				
Lime sower	1940	100	60	50				
Manure spreader	1940	175	105	88				
Grain drill—fertilizer	1942	265	225	192				
7-foot mower	1938	140	60	50				
Grain binder	1934	240	85	70				
Corn binder	1936	250	75	65				

These 12 items total $1,506 *on January 1, 1944.* The value of these same items the year before was set at $1,787, whereas the original prices amounted to $3,060. This arrangement is purely for illustration. Some might like to place the items by types of machines, the grain machinery in one group, for example. Differences in value such as are shown here are not acceptable as depreciation (for the year 1943) unless the computed depreciation was subtracted from the 1943 values to get the 1944 values, item by item.

Buildings are normally valued on the basis of cost less observed depreciation and obsolescence. Once the original value is set up, it is usually best to take depreciation on a straight line basis by dividing the original value set by the estimated life in terms of years. Digest pages 482-483 shows "Estimated Useful Lives and Depreciation Rates " suggested by the Internal Revenue Department. See also bottom of Digest Page 485.

Once inventory values are established, there are many reasons for keeping the values fairly constant from year to year, allowing only for depreciation and obsolescence.

Illustrations from Farmers' Bulletin No. 1962

PRODUCTION, PERFORMANCE, AND INCIDENTAL RECORDS

These records are supplementary to the financial records and inventory already discussed. They are not absolutely necessary but help in analyzing the business. They may be many or few, depending on the wishes of the operator and the time he has available to summarize and analyze them. Some of the most common types are:

1. Dairy and egg production records.
2. Acreage and yield summaries.
3. Feed consumption and a running inventory of feed supplies.
4. Numbers of livestock.
5. Labor records.

HOUSEHOLD AND PERSONAL ACCOUNTS

Household accounts and personal accounts should be handled entirely separate from the farm accounts. The same principles of record keeping will apply but for business reasons as well as for reporting income taxes, it is preferable to keep them separate.

SUMMARIZING RESULTS

At the end of the year the records should be completed according to the plan outlined at the beginning of the year. All columns should be added (to get the totals for the year). Next, set up the annual inventory. The cash on hand plus expenses should equal the income for the year. Some difference is to be expected because most people miss a few items. By rechecking the columns or pages in the financial record for items that ought to be there, it is usually possible to find the more important errors. In case the record cannot be balanced exactly, it is probable that the difference was spent for small items that you failed to mark down. Record the difference as money spent--this completes the books. These records now become the basis for reporting income and can also be used to get the answer to questions regarding costs and other problems related to income and management.

Unit cost of production is figured by dividing the total cost by the number of units produced or the number of units available for sale. There are two common ways of computing costs. One is based on the actual expense paid out. The remainder is considered as payment for the operator's labor, unpaid family help and interest on the investment. The other takes into account all costs including interest on capital investment, operator's labor and unpaid family labor.

INCOME TAX CONSIDERATIONS

For income tax purposes, the annual inventory should be broken down into capital assets and other assets. Capital items include land, buildings, equipment, workstock and breeding animals -- everything else is considered inventory for income tax purposes. (See Digest pages 479-486 for Income Tax guidance.)

ROTATIONS COMMONLY USED IN ILLINOIS

The rotations listed below are adapted to field areas. They are not intended for use on hog lots, poultry lots, gardens, orchards, and other places where intensified operations are carried on.

In adapting these rotations to the needs of an individual farm, the following substitutions may be made:

Soybeans for corn
Rye for wheat
Spring barley or spring wheat for oats in northern Illinois
Winter barley or winter oats for winter wheat, in southern or southwestern Illinois
Cowpeas for soybeans in southern Illinois and on sandy soils in the central part of the state
Vetch for clover on sandy soils

Perennial grasses and legumes should usually be included in all hay and pasture seedings, especially on all land subject to erosion. "Clover" refers to any kind of clover, alfalfa, or lespedeza, or a mixture of any of these with grasses.

Rotation No.	First year	Second year	Third year	Fourth year	Fifth year	Sixth year	Seventh year	Condition where often used
1	Corn	Oats (s.cl.)						Level land May pasture off oats or make hay
2	Wheat	Clover						Wheatland subject to erosion
3	Corn	Oats	Clover					Level land and land subject to some erosion
4[a]	Corn	Oats (s.cl.)	Corn Sweet clover					Level cornland
5	Corn	Soybeans	Sweet clover					Level land. May sow sweet clover on soybean stubble in winter or in spring
6	Corn	Wheat	Clover					Land subject to erosion
7[a]	Corn	Oats Soybeans	Clover Oats (s.cl.)					Level land
8	Corn	Corn	Sweet clover					Overflow land. May sow sweet clover last cultivation, freeze-in, or sow in spring
9	Corn	Oats	Wheat (s.cl.)					Land subject to some erosion
10[a]	Corn	Soybeans Oats	Wheat (s.cl.) Clover					Level land
11	Corn	Corn	Oats	Clover				Level corn soils
12[a]	Corn Grass	Corn	Oats	Clover				Similar to Rotation 10, but less corn and more grass
13	Corn	Oats	Wheat	Clover				Corn and wheatland
14	Corn	Oats	Clover	Wheat (s.cl.)				Similar to Rotation 12, but provides for more clover
15	Corn	Wheat	Clover	Wheat (s.cl.)				Wheatland subject to erosion
16	Corn	Soybeans	Oats Wheat	Clover				Soils not subject to erosion
17[a]	Corn	Oats Wheat	Clover	Grass				Soils subject to erosion
18	Corn	Oats (s.cl.)	Corn	Oats	Clover			Heavy soils that need fall plowing in northern Illinois
19	Corn	Corn	Oats	Wheat	Clover			Level corn and wheat soils
20	Corn	Corn	Oats	Clover	Wheat (s.cl.)			Level corn and wheat soils
21	Corn	Oats	Wheat	Clover	Wheat (s.cl.)			Wheat soil subject to erosion
22	Corn	Oats	Wheat	Clover	Grass			Soils subject to erosion
23	Corn	Wheat	Grass	Grass	Grass			Soils subject to much erosion
24	Corn	Soybeans	Wheat	Clover	Wheat (s.cl.)			Level wheatland
25	Corn (s.cl.)	Corn	Soybeans	Wheat	Clover			Level land, sow sweet clover at last cultivation of corn
26	Corn	Oats	Clover	Wheat	Clover	Wheat (s.cl.)		Wheat soils subject to erosion
27	Corn	Oats (s.cl.)	Corn	Soybeans	Wheat	Clover		Level land
28	Corn	Oats	Wheat	Clover	Corn	Oats	Clover	Corn and wheatland

[a] Rotations 4, 7, 10, 12, and 17 have been called "split rotations." Rotation 4, for example, fits a farm with three fields, but each year a part of the field which was in oats with sweet clover the preceding year is put in corn and the remainder is left in sweet clover for pasture or seed. Such a rotation makes it relatively easy to adjust the acreage of grain, hay, and pasture to fit soil, livestock, and other needs.

CROP ROTATIONS FOR MISSOURI LAND CLASSES

Class	Description	Principal upland Series	Condition of Erosion	Slope 0 to 3%	Slope 3 to 6%	Slope 6 to 10%	Slope 10 to 20%
I	Productive land, all suitable for cultivation. Average corn yields 40 or more bushels per acre	Marshall Grundy Summit	Slight	C, C, SG, S Cl	C, C, SG, S CL	*C, SG, Leg.	Topograhy as well as fertility, etc., affects class. No Class I land this steep.
			Moderate	C, SG, S Cl.	C, SG, S CL.	S, SG, Leg., Hay	
			Severe	SG, Leg., Hay	SG, Leg., Hay	SG, Leg., Hay	
II	Above medium productivity, all suitable for cultivation. Av. corn yields 30 to 40 bushels per acre	Carrington Edina and better grades of Knox, Shelby and Pettis	Slight	C, SG, Leg.	C, SG, Leg.	C, SG, Leg.	SG, Hay
			Moderate	C, SG, Leg.	C, SG, Leg.	SG, Hay	Rot. Past.
			Severe	SG, Rot. Past.	SG, Rot. Past.	Rot. Past.	Perm. Past.
III	Land of medium productivity, practically all tillable. Av. corn yields 20 to 30 bushels per acre	Crawford Decatur Eldon Hagerstown Leslie Memphis Oswego Putnam	Slight	C, S, SG, Leg.	C, S. SG, Leg.	SG, Hay	Perm. Past.
			Moderate	C, S, SG, Leg.	C, SG, Leg.	Rot. Past.	Perm. Past.
			Severe	SG, Rot. Past.	SG, Rot. Past.	Perm. Past	Perm. Past.
IV	Below medium productivity. May or may not be tillable but suitable for pasture. Av. corn yields below 20 bushels per acre	Bates Baxter Cherokee Lindley Tilsit Union Gerald	Slight	S, SG, Hay	S, SG, Hay	Perm. Past.	Perm. Past. or Forest
			Moderate	S, SG, Hay	SG, Hay	Perm. Past.	
			Severe	SG, Rot. Past.	Rot. Past.	Perm. Past.	
V	Mainly forest or rough pasture, because of low fertility, rough surface, erosion, stone content or wet condition	Ashe Boone Clarksville Hanceville Marion Lebanon	Slight	*Perm. Past. or Forest	Perm. Past. or Forest	Forest	Forest
			Moderate			Forest	Forest
			Severe			Forest	Forest

Key to abbreviations: C Corn; SG Small Grain; S CL. Sweet Clover; S Soybeans or Cowpeas; Leg. Legume (mainly Red or Clover but may be sweet clover or lespedeza); Rot. Past. Rotation pasture; Hay any meadow or pasture grasses used for hay.

* Except for Marshall, very little land of this slope should be considered in Class I.

SEEDING AND UTILIZATION OF PASTURE CROPS — MISSOURI

Pasture Crop or Mixture	Weight per bushel of seed	Amounts to seed per acre	Usual months of seeding (1)	Type of land to which adapted	Preparation and fertilizer recommended	Months in which pasture will be available	Mature cows per acre
Ky. Bluegrass Timothy Red Clover	15# 45# 60#	5# 10# 6#	Sept., Mar. " " Mar., Apr.	Good land where first crop is used for hay	Thorough prep. 200-400# 4-16-4 except on better soils	April, May, June Sept. and Oct. or Dec., Jan., and Feb.	1
Ky. Bluegrass Timothy Orchard Grass Korean Lespedeza	14# 45# 14#	5# 5# 5# 5#	Sept., Mar. " " (2)" " Mar.	Good land; used for pasture only	Same as above	Same as above	1
Orchard Grass Redtop Korean Lespedeza	14# 14#	8# 4# 10#	(2) Sept., Mar. " " Mar.	NE Mo. prairies; better Ozarks; poor land NW Mo.	Thorough seed bed prep. No fertilizer	Late Mar. to Nov. or Dec.	1/2
Redtop Korean Lespedeza	14#	8# 10#	Sept., Mar. Mar.	Poor soils; mainly Ozark uplands	Same as above	May to Nov.	1/3
Sweet Clover	60#	20# hulled 30# unhulled	April Jan., Feb.	Better soils in regular rotation	1 to 3 tons lime on acid soils. 200# phos. on poorer soils	1st yr: Aug. and Sept. 2nd yr: Mar. to July	1 to 3
Crimson Clover	60#	10#	Late Aug. or Sept.	Perry Co. and similar soils of S Mo	No fertilizer on adapted soils	Mar., Apr., May	
Korean Lespedeza	40 to 50#	15 to 20#	Feb., Mar.	All land too poor for Red Clover	None required	June thru Sept.	1 to 2
Sudan Grass	28#	25#	Late May	Medium to fertile land, tillable	Seed bed as for corn; no fert.	July and Aug.	2 to 3
Orchard Grass	14#	20#	March	Woodland, shaded	No fert. Disked if practicable.	Apr. to Oct.	
Winter Barley	48#	2 bu.	Late Aug. to Oct. 1	Medium to fertile soil	Seed bed as for wheat; 150-200# super phosphate	Oct. and Nov. Apr. and May	1
Wheat	60#	1½ bu.	Sept. 15 to Oct. 15	Medium to fertile soil	Same as above	Nov., Dec., Apr., May to June 15	1/2 in fall 1 in spring
Rye	56#	2 bu.	Late Aug. to Oct. 1	Poorer cultivated soil	No fertilizer	Oct., Nov., Dec., Mar., Apr., May	1/2

(1) When conditions permit, the months of February and August for spring and fall seeding, respectively, will usually give better results than later seedings. (2) Fall seeding only south of Missouri River.

ALL-YEAR PASTURES

These three main crops of the all-year pasture system—bluegrass, lespedeza and barley—may be grazed in seasonal progression as follows:

(1) bluegrass pasture in late spring, early summer and winter;
(2) lespedeza pasture in midsummer and late summer; and
(3) barley or other grain pasture through the whole fall and early spring.

In the areas of medium to low fertility the combination of redtop or orchard grass, lespedeza, and rye, will generally be found more practicable than any other for the year-round pasture plan.

University of Missouri,

SOIL PRODUCTIVITY BALANCE SHEET FOR CROPLAND

An engineering "yardstick" by which to measure the annual RATE of rise or fall in the producing capacity of a farm's CROPLAND.

FORCES FOR BAD

Harvested	ACRES a	FACTOR b	DEBITS a x b
1 Corn,potato,beet...		-2.0	–
2 Wheat,rye..........		-1.0	–
3 Oats,spr. barley...		-1.0	–
4 Soybean,hay or bean		-0.5	–
5 - - - - (See Sch.A)		–	–

	ACRES of all Cropland (1-5,9-13) a	Estimated SLOPE of all cropland Ft.fall in 100' b	FACTOR c	DEBITS axbxc
6			-1/10	–

	TONS a	FACTOR b	DEBITS a x b
7 Open-lot Manure....		-.07	–

8 SUM FOR BAD......................	–

FORCES FOR GOOD

Cut or Grazed	ACRES a	FACTOR b	CREDITS a x b
9 Timothy,seeded 1 yr. before..........		+.25	+

(FORCES FOR GOOD CON'T)

10 Red clover, Seeded 1 yr. before...............		+2.0	+
11 Alfalfa, seeded 1yr. before.................		+2.5	+
12 - - - - - (See Sch. A).		+	+

13 Crop, Unharvested, ungrazed (Sch. A).......		+	+
14 Stalks, straw left, on land.................		+.25	+

	ACRES a	SLOPE b	FACTOR c	CREDITS axbxc
15 In SOD all year (Items 9-12)......		Item 6b	+1/10	+
16 In CROP over winter (Item 2).........			+1/20	+
17 Residue COVERING, bare soil.........			+1/30	+
18 Terraced or stripped			+1/15	+
19 Tilled on CONTOUR...			+1/30	+

	TONS a	FACTOR b	CREDITS a x b
20 Fertilized on cropland..		+1.5	+
21 Manure on cropland......		+.15	+

22 SUM FOR GOOD...............................	+

23 [Net (Items 8 & 22)] ÷ [Cropland (Items 6a)] = [of 1% SOIL PRODUCTIVITY BALANCE]

HOW TO ESTIMATE RISE OR FALL IN SOIL PRODUCTIVITY BY "BALANCE SHEET"

SET down acres (omitting fraction) of each kind of crop occupying the "cropland" in the crop year for which estimation is being attempted. In Item 1, include all corn whether hogged off, ensiled, shocked, or picked. If stalks are left on land, take credit for them in Item 14. If straw of Items 2,3,4 remains on land, account for it also in Item 14.

"Degrading" crops not listed above, enter in Item 5 and refer to Schedule A for values. For any crop diverted to soil improvement, use Item 13 instead.

ITEM 6a must include all cropland, after correction for any duplication of acres that may occur in Item 13. A rough average (though an approximation) is placed in Item 6b and also in Items 15b - 19b. For Items 7 and 21 use either tons or loads, arrived at by count, or estimation, or by calculation.(See Schedule B on back).

ITEMS 9,10,11, 12, refer to the effect of these crops up to the end of the season whether actually utilized for hay or pasturage. If not so utilized, then use Item 13 instead, adding extra credits - "for top-growth" appearing in Schedule A and use combined value in Column b.

ITEM 17 has to do with curbing erosion and water loss and is not to be confused with another function (Item 14).

ITEMS 18 and 19 apply ONLY to land in row and/or drill crops this season. A specific area claimed in 18 cannot be claimed in 19; and vice versa. A single value belongs in Column b, it being identical with Item 6b. Multiply this value by each entry in Columns a and c.

TONS of fertilizer (in terms of single strength) in Item 20 are to include that applied to cropland in the crop season for which estimate is being made.(See Schedule C)

FINALLY - - in Item 23 - - divide the EXCESS of debits or of credits by the total acres of cropland. Prefix (+) or (–). The result expresses the RATE of rise or fall in soil productivity for the year.

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SOIL PRODUCTIVITY BALANCE SHEET FOR CROPLAND

SCHEDULE A—Productivity Factors

ITEM 5	FACTOR
CROP HARVESTED OR GRAZED	
Buckwheat........................	-1.5
Cabbage..........................	-1.5
Canning Pea......................	-0.5
Cowpea...........................	-0.5
Cropland, Fallowed...............	-0.5
Cropland, idle...................	0
Flax.............................	-1.0
Fruit trees,cultivated...........	-2.5
Millet...........................	-1.5
Onion............................	-2.0
Popcorn..........................	-2.0
Rape.............................	-1.5
Sorghums.........................	-2.0
Sweet corn.......................	-2.0
Sudan Grass......................	-1.5
Tomato...........................	-2.0
Vineyard,cultivated..............	-2.5
ITEM 12	
FORAGE CROPS AND SO USED	
*Alfalfa, seeded 2 yrs. before..	+0.5
*Alfalfa, seeded 3 yrs. before..	0
Bromegrass, orchardgrass same as Timothy	
Tim-Clov.Mix,Seeded 2 yrs.before	+0.25
Lespedeza, annual................	+0.5
*Sweet Clover,seeded 1 yr.before	+3.0
Timothy, seeded 2 yrs. before...	0
*Alone or in mixtures of which 50% or more is legume.	
ITEM 13	
GREEN MANURE AND/OR WINTER COVER	
Alfalfa top growth left on land.	+3.0
Corn,used as green manure.......	+1.5
Clovers,common,top growth left on land..........................	+2.7
Cowpea,turned under green.......	+1.5
Crimson clover,turned under green	+1.0
Grasses,top growth left on land.	+1.0
Soybean turned under green......	+1.5
Sweet clover turned under green.	+1.5
Sericea,top growth left on land.	+1.5
Sudan clover,turned under green.	+1.0
Small grain cover crop turned under or clipped...............	+0.5
Timothy,top growth left on land.	+1.0
Vetch,turned under green........	+1.5
Year's top growth Of any hay crop left on land, add to hay factor..	+0.7
ITEM 14	
RESIDUE LEFT ON LAND	
Beet and Tomato tops,haulm......	+0.25

SCHEDULE B—Tonnage of Manure Produced for Cropland

To Estimate the tonnage of manure available for Cropland in a single year, one of the two following methods , may be employed.

Method 1 - Based on Estimated Loads Hauled (less accurate)

Estimated acreage of CROPLAND SOD well grazed.........................	
About How many MONTHS so grazed , during the year.................	
Item 21a Tonnage of MANURE directly on grazed Cropland................. (Above acres x months x ½ ton)	
*Estimated tonnage hauled from BARN or SHED......................	
*Estimated tonnage hauled from , OPEN LOT.......................	
Item 21b Combined Tonnage from BARN AND LOT (Sum of Above)	

(SCHEDULE B CONTINUED)

Method II - Based on Numbers of Livestock(more accurate)

GRAZED on Cropland SOD					Livestock in BARN & OPEN-LOT			
HEAD a	MONTHS IN FIELD b	TONS per Mo. per Hd. c**	TONNAGE of MANURE axbxc	KIND	HEAD a	MONTHS Con-fined b	TONS per Mo. per Hd. c***	TONNAGE of MANURE axbxc
		0.8		Horses & Mules...			1.2	
		0.7		Cows kept			1.0	
		0.3		Young cattle (not veal).....			0.4	
		0.6		Beef Cattle fattened.			0.8	
		0.3		Sows kept.			0.4	
		0.06		Pigs fed out:raised &/or bought			0.12	
		0.08		Ewes kept			0.12	
		0.03		Lambs fed out:raised &/or bought			0.05	
		0.005		Poultry...			0.01	

Item 21a On GRAZED Cropland. ☐

Item 21b Combined Tonnage in BARN & OPEN-LOT...... ☐

OF the winter-produced Manure, about what FRACTION is normally produced in an OPEN-LOT: (2)

All	4/5	2/3	1/2	1/3	1/4	1/5	0

Item 7 Tonnage of OPEN-LOT Manure.......................... ☐
(Above fraction x Item 21b)

*Standard spreader 1 ton; large size 1½ tons.
**Amounts (no bedding) have been adjusted to the equivalent of cattle manure.
***Amounts (including bedding) have been adjusted to the equivalent of cattle manure as measured by crop-producing effect.

SCHEDULE C—Fertilizer Tonnage Applied to Cropland within a Single Crop Year

ON CROPLAND	ACRES TREATED	WITH 0-20-0 0-14-6 0-10-10 2-12-6 4-10-6 etc. b	WITH 0-21-9 3-18-9 3-9-18 etc. c	WITH 0-44-0 0-20-20 4-24-12 etc. d	TOTAL AMOUNT Expressed as Single Strength 1 x a x b or 1½ x a x c or 2 x a x d
		lbs./ acre	lbs./ acre	lbs./ acre	lbs./yearly
Corn............					
Wheat...........					
Oats,barley.....					
Beets,tobacco...					
...					

Total on Cropland Yearly (in terms of Single strength). Lbs.
Item 20 Expressed as Tons of Single Strength goods (lbs.÷2000).......... Tons

Source: Material combined from J.A. Slipher's Long Form and Short Form Soil Productivity Balance Sheet by Digest Editors.

FEED BUYING GUIDES

Two of the more important ways of comparing feed are on the basis of protein content and total digestible nutrients (TDN). Under certain conditions it is possible to profitably substitute one ingredient for another. The following tables have been prepared to show the cost per pound of protein and TDN from various ingredients at different prices.

COST PER POUND OF CRUDE PROTEIN AT VARIOUS PRICES

Price per Ton	Soy-bean Meal 44%	Soy-bean Meal 41%	Cotton-seed Meal 42%	Lin-seed Meal 35%	Lin-seed Meal 31%	Peanut Meal Meal 45%	Coco-nut oil Meal 21%	Corn Gluten Meal 43%	Tank-age 60%	Meat Scraps 50%	Fish Meal 63%
	cents	cents	cents	cents	cents	cents	cents	cents	cents	cents	cents
$ 50	5.7	6.1	6.0	7.1	8.1	5.6	11.9	5.8	4.2	5.0	4.0
55	6.2	6.7	6.5	7.9	8.9	6.1	13.1	6.4	4.6	5.5	4.4
60	6.8	7.3	7.1	8.6	9.7	6.7	14.3	7.0	5.0	6.0	4.8
65	7.4	7.9	7.7	9.3	10.5	7.2	15.5	7.6	5.4	6.5	5.2
70	8.0	8.5	8.3	10.0	11.3	7.8	16.7	8.1	5.8	7.0	5.6
75	8.5	9.1	8.9	10.7	12.1	8.3	17.9	8.7	6.2	7.5	6.0
80	9.1	9.8	9.5	11.4	12.9	8.9	19.0	9.3	6.7	8.0	6.3
85	9.7	10.4	10.1	12.1	13.7	9.4	20.2	9.9	7.1	8.5	6.7
90	10.2	11.0	10.7	12.9	14.5	10.0	21.4	10.5	7.5	9.0	7.1
95	10.8	11.6	11.3	13.6	15.3	10.6	22.6	11.0	7.9	9.5	7.5
100	11.4	12.2	11.9	14.3	16.1	11.1	23.8	11.6	8.3	10.0	7.9
105	11.9	12.8	12.5	15.0	16.9	11.7	25.0	12.2	8.7	10.5	8.3
110	12.5	13.4	13.1	15.7	17.7	12.2	26.2	12.8	9.2	11.0	8.7
115	13.1	14.0	13.7	16.4	18.5	12.8	27.4	13.4	9.6	11.5	9.1
120	13.6	14.6	14.3	17.1	19.4	13.3	28.6	14.0	10.0	12.0	9.5
125	14.2	15.2	14.9	17.9	20.2	13.9	29.8	14.5	10.4	12.5	9.9

COST PER POUND OF TDN* AT VARIOUS PRICES

Price per CWT	Corn 80.1%	Oats 70.1%	Barley 77.7%	Wheat 80.0%	Wheat Stand. Middlings 77.2%	Wheat Bran 67.2%	Beet Pulp 67.8%	Citrus Pulp 74.4%	Dried Brewers Grains 61.8%	Hominy Feed 84.5%	Cane Molas-ses 54.0%
	cents	cents	cents	cents	cents	cents	cents	cents	cents	cents	cents
$1.00	1.2	1.4	1.3	1.2	1.3	1.5	1.5	1.3	1.6	1.2	1.9
1.25	1.6	1.8	1.6	1.6	1.6	1.9	1.8	1.7	2.0	1.5	2.3
1.50	1.9	2.1	1.9	1.9	1.9	2.2	2.2	2.0	2.4	1.8	2.8
1.75	2.2	2.5	2.3	2.2	2.3	2.6	2.6	2.4	2.8	2.1	3.2
2.00	2.5	2.9	2.6	2.5	2.6	3.0	2.9	2.7	3.2	2.4	3.7
2.25	2.8	3.2	2.9	2.8	2.9	3.3	3.3	3.0	3.6	2.7	4.2
2.50	3.1	3.6	3.2	3.1	3.2	3.7	3.7	3.4	4.0	3.0	4.6
2.75	3.4	3.9	3.5	3.4	3.6	4.1	4.1	3.7	4.4	3.3	5.1
3.00	3.7	4.3	3.9	3.7	3.9	4.5	4.4	4.0	4.9	3.6	5.6
3.25	4.1	4.6	4.2	4.1	4.2	4.8	4.8	4.4	5.3	3.8	6.0
3.50	4.4	5.0	4.5	4.4	4.5	5.2	5.2	4.7	5.7	4.1	6.5
3.75	4.7	5.3	4.8	4.7	4.9	5.6	5.5	5.0	6.1	4.4	6.9
4.00	5.0	5.7	5.1	5.0	5.2	6.0	5.9	5.4	6.5	4.7	7.4
4.25	5.3	6.1	5.5	5.3	5.5	6.3	6.3	5.7	6.9	5.0	7.9
4.50	5.6	6.4	5.8	5.6	5.8	6.7	6.6	6.0	7.3	5.3	8.3
4.75	5.9	6.8	6.1	5.9	6.2	7.1	7.0	6.4	7.7	5.6	8.8
5.00	6.2	7.1	6.4	6.2	6.5	7.4	7.4	6.7	8.1	5.9	9.3

* Total Digestible Nutrients.

A handy table for converting price per bushel to price per Cwt. may be found on page 518.

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FEED NUTRIENTS

Balanced rations are the key to efficient feeding. Today 100 pounds of pork have been produced from 350 pounds of concentrates, one pound of broiler meat from less than 3 pounds of feed. Only a few years ago farmers were satisfied to get 100 pounds of pork from 750 pounds of grain; one pound of broiler meat from 3.5 to 4 pounds of feed. Improved feeds and feeding practices have played a major role in the increased output and efficiency of American farms.

Research shows that a balanced ration consists of the proper amounts of protein, carbohydrates, fats, minerals and vitamins.

Proteins are composed of complex amino acids. These substances are made up of carbon, hydrogen, oxygen, nitrogen. Many amino acids are required by an animal for normal growth. Not all of these are present in any one protein feed. Thus, it is essential to select different proteins in proper proportions for the best feed efficiency. This is what is meant by "quality of protein".

AMINO ACIDS

- Lysine
- Tryptophan
- Histidine
- Phenylalanine
- Leucine
- Threonine
- Isoleucine
- Methionine
- Valine
- Arginine
- Glycine
- Alanine
- Serine
- Cystine
- Tyrosine
- Aspartic acid
- Glutamic acid
- Proline
- Hydroxyproline
- Citrulline

The function of proteins is to build up the body and maintain muscle, gland, nerve, skin, bone, hair, horn and hoof tissue. An animal lacking the proper amount or quality of protein cannot be expected to produce the optimum amounts of milk or meat.

Protein roughages are high fiber feeds containing large amounts of protein. Examples are alfalfa, clover and other legume hays. Protein concentrates are feeds low in fiber but high in body building proteins. Concentrates high in protein are linseed meal, soybean meal, cottonseed meal, meat scraps, wheat bran, shorts and dry beans.

The protein requirements of some animals may be met in part by the non-protein nitrogen compound urea. Research has proven conclusively that ruminants (cattle and sheep) can utilize urea in their rations.

During the protein shortage of World War II, many dairy rations contained some urea. However, the ruminant cannot depend upon urea as its only source of protein. An excess of urea can be toxic. Studies show that not over 3 percent (by weight) of the concentrate mixture should be urea.

Carbohydrates are composed of carbon, hydrogen and oxygen but no nitrogen. They produce heat and energy and may be stored in the body as fat. Carbohydrate roughages are bulky feeds high in sugars. Prominent examples are grass hay, beet pulp, corn fodder, silage, sorghum fodder and straw from small grains. Carbohydrate concentrates are condensed energy feeds that break down to produce milk, work and fat. Feeds high in carbohydrates include corn, wheat, oats, barley, milo and molasses.

From a nutritional standpoint, carbohydrates are broken down into two groups -- fiber and nitrogen-free extract. Fiber includes the relatively insoluble carbohydrates such as cellulose. Nitrogen-free extract is made up of the more readily soluble ones such as starches and sugars. Only a small part of a ration should be fiber, particularly in the case of non-ruminants. Ruminants can make a much better use of fiber than animals with only a single stomach.

Fats are also made up of carbon, hydrogen and oxygen but no nitrogen. The proportions of carbon and hydrogen are much greater than in carbohydrates. Fats produce 2.25 times as much heat or energy upon oxidation as do carbohydrates. Small amounts of fat are found in corn, bran, oats and kafir. Larger amounts are found in the vegetable meals and animal protein concentrates.

Minerals are necessary not only for the good health of animals, but for life itself. Bones are made up mainly of minerals, namely calcium and phosphorus. Minerals are also a necessary part of the soft tissues and fluids of the animal body. Even the regular beating of the heart is dependent upon proper amounts of calcium and potassium in the blood.

Vitamins are necessary in all animal nutrition. A supply of nearly all the known vitamins is required by swine and poultry in their rations. Cattle, sheep and goats are able to produce a large number of the B-complex vitamins in their rumen. The more important vitamins include vitamin A, vitamin D, the B-complex, (thiamine, riboflavin, niacin, pyridoxine, folic acid, vitamin B_{12}, pantothenic acid, biotin, choline,) vitamin C, vitamin E and vitamin K.

Antibiotics are the latest rage in the world of nutrition. Penicillin, streptomycin, aureomycin, neomycin, chloromycetin and terramycin are the most popular wonder drugs to date. Many are used in feeds to combat disease. Others are believed to be growth-stimulating factors. Antibiotics and other drugs should be handled with care and used only according to the manufacturer's instructions.

IMPORTANCE OF PALATABILITY

Feeds may contain all the necessary nutrients in proper balance and still not give satisfactory results. If a ration does not taste good, feed efficiency will be impaired. Not only will animals fail to eat the proper amounts of unpalatable feeds, but digestion will be inhibited. Familiarity and habit are important factors concerned with the palatability of a ration. Avoid sudden shifts from one feed to another.

FEED SUBSTITUTION TABLES

Changing feed costs, crop failures, and feed shortages often make substitution of other feeds necessary or advisable. These tables show amounts of feed that give equal value in the feeding ration. Due to bulk, palatability, or different nutrient contents, some feeds cannot safely be substituted completely. The recommended limit to which substitution can be carried is given. All corn is on a shelled corn basis. The costs of the various possible substitutes should be considered before making your decisions. See pages 517 and 518.

Feed to be Replaced	Amount (Lb.)	Feed to be Substituted	Amount Required (Lb.)	Amount that can be replaced. (Per cent)
FATTENING HOGS				
Corn	100	Wheat (ground)	95-100	100
Corn	100	Barley (ground)	110	100
Corn	100	Rye (ground)	110	50-75
Corn	100	Oats (ground)	115	33-1/3
Corn	100	Hominy feed	100	50
Corn and Tankage	100	Wheat middlings	120-135	50-75
Corn	100	Grain sorghums*	110	100
Corn	100	Sunflower seed	100	50
Corn	100	Cooked potato	500	20
Corn	100	Dehydrated potatoes	100	30
Corn	100	Hog millet	100	50
Corn	100	Rice bran	100	33-1/3
Corn	100	Rice screenings	95	100
Corn	100	Rough rice	115	50
Wheat	100	Cull peas	80-90	20-33-1/3
Tankage	100	Meat scrap	100	100
Tankage	100	Soybean oil meal	150	80
Tankage	100	Cottonseed or linseed meal	150	33-1/3
Tankage	100	Buttermilk (semi solid)	300	100
Tankage	100	Fish meal	85	100
Tankage	1	Skim milk	1 Gal.	100
Soybean meal	100	Cottonseed or linseed meal	100	20-25
Pasture	---	Alfalfa meal	10% of Ration	100
Skim milk	100	Buttermilk (liquid)	100	100

*Threshed and ground coarsely

BROOD SOWS

Corn	100	Barley	100	100
Corn	100	Rye	100	100
Corn	100	Oats	110	50
Tankage	100	Legume hay or pasture (high quality)	150	100 for Sows 75 for Gilts

POULTRY

Corn	100	Hominy feed	100	100
Corn	100	Wheat	100	50-65
Corn	100	Grain sorghums	100	100
Corn	100	Whole rough rice	100	75
Corn	100	Sweet potato meal	100	20
Corn	100	Barley	100	100
Mash mixture	100	Sweet potato meal	100	20-25
Corn (in growing mash)	100	Millet (ground)	100	50
Corn (in scratch feed)	100	Millet	100	100
Alfalfa meal	100	Dehydrated clover	100	100
Oats	100	Buckwheat	100	33-1/3

FEED SUBSTITUTION TABLES

Feed to be Replaced	Amount (Lb.)	Feed to be Substituted	Amount Required (Lb.)	Amount that can be replaced. (Per cent)

DAIRY CATTLE

Corn	100	Wheat	100	50
Corn	100	Grain sorghum (ground)	100	100
Corn	100	Barley	100	100
Corn	100	Hominy feed	100	50
Corn	100	Molasses	100	10
Corn	100	Rye	100	20-25
Corn	100	Dried citrus peel and pulp	100	50
Corn	100	Sweet potato meal	100	100
Oats and Wheat bran	100	Brewers grain	100	100
Oats	100	Buckwheat	110	33-1/3
Grain	1	Mangels, rutabagas, carrots beets, pumpkins	10	Up to 60 lb. daily after milking
Corn silage	3/4 T.	Sorghum silage	1 T.	100
Corn silage	100	Sunflower silage	100	100
Corn silage	100	Potatoes	100	100
Legume hay	1 T.	Legume silage	3 T.	75
Hay	1 T.	Corn silage	3 T.	75
Alfalfa hay	100	Sugar beet tops	115	70
Linseed, soybean or cottonseed meal	100	Ground lespedeza seed	100	100
Bran	100	Alfalfa meal	100	100

BEEF CATTLE

Corn 100# Shelled Corn =	100	Grain sorghums	100	100
Corn 110# Corn & Cob Meal	100	Hominy feed	100	50
Corn	100	Barley (cracked)	100	25
Corn	100	Wheat (cracked)	100	50
Corn	100	Oats	115	50*
Corn Hay	335 600	Corn silage	1 T.	33-1/3
Corn	100	Dried sweet potatoes Cottonseed meal	105 5	100
Corn silage	3/4 T.	Sorghum silage	1 T.	100
Cottonseed meal	100	Peanut meal	100	100
Grain ration	100	Dried beet pulp	100	50

SHEEP AND LAMBS

Corn	100	Grain sorghums	100	100
Corn	100	Oats	100	50**
Corn	100	Barley	110	100
Corn	100	Rye	100	100
Corn	100	Dried beet pulp	110	50
Wet beet pulp	100	Potatoes	100	100
Soybean meal	100	Soybeans	105	100
Alfalfa	1 T.	Soybean hay	1.15-1.2 T.	100
Sweet clover, cowpea and lespedeza are also satisfactory hays for sheep.				

*Only for calves during first 90 days feeding.
**For first half of feeding period.

HAY AND ROUGHAGE BUYING GUIDE

Roughage values for fattening cattle if alfalfa is worth $20:

Red Clover	$18	Lespedeza Hay	$15	Prairie Hay	$13	Corn Silage	$7
Soybean Hay	16	Oat Hay	15	Sorghum Fodder	13	Oat Straw	5
Corn Fodder	15	Timothy Hay	14	Corn Stover	7	Wheat Straw	4

SOURCES: Mo. Circ. 321, 451; Texas Bul. 613, 658; Purdue Circ. 320, 347; Ill. Agr. Handbook; Nebr. Bul. 353, 359; Colo Tech. Bul. 37, Circ. D38; Ohio Special Circ. 70; Ark. Bul. 478; N.D. Bul. 318; S.D. Bul. 337; La. Circ. 33; Dela. Circ. 13; Ill. Circ. 414, 253, 502; Idaho Circ. 105; Iowa Bul. P99; Okla. Bul. B270, 296.

FEED SUBSTITUTION TABLES

In any feeding program it is often found advisable to substitute one feed for another for such reasons as crop failure and cheaper costs. The following data will aid in determining what and when adjustments can or should be made. In determining the relative economy of substituting one feed for another also make use of Digest page 517. Page 536 deals with ways of using wheat in the ration, a procedure that is always appropriate in areas where wheat is grown in excess of local demands, and is especially important now when wheat feeding is being urged.

Feed costs are a major cost in any livestock program. Profits and certainly maximum profits depend to a large degree upon the use of those feeds which can be purchased most cheaply in proportion to value for the intended use.

Market changes are often rapid so there must be a restudy of price relationships every time major purchases are made. There are cases where it is even profitable to sell crops grown on the farm and purchase less costly crops to cover feed requirements.

WORK HORSES

Feed To Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity, Pounds	Extent to Which Substitution May Be Carried
Barley, Crushed . .	100	Corn	100	To 100% of grain
Oats.	100	Corn	100	To 100% of grain
Corn.	100	Oats	100	To 100% of grain
Sheaf Oats.	2000	Oat grain Timothy Hay	990 1000	To 100% of oats
Bran.	100	Oats	100	To 50% of grain

BEEF CATTLE

Feed To Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity, Pounds	Extent To Which Substitution May Be Carried
Wheat	100	Corn	100	To 50% of corn
Barley.	100	Corn	100	To 100% of corn
Beet pulp, dry. . .	100	Silage	400	To 100% of silage
Oats.	100	Corn	82	To 100% of corn
Wheat bran.	100	Oats	87	To 100% of oats
Roots	100	Silage	30	To 100% of silage
Shorts.	100	Oats	100	To 100% of oats

DAIRY

Feed To Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity, Pounds	Extent To Which Substitution May Be Carried
Barley.	100	Corn	100	To 100% of grain
Wheat	100	Corn	100	To 50% of grain
Molasses.	100	Corn	100	To 10% of grain
Nonlegume roughage.	100	Legume Hay	100	To 100% of hay

FATTENING HOGS

Feed To Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity, Pounds	Extent To Which Substitution May Be Carried
Barley.	100	Corn	85	To 100% of grain
Wheat	100	Corn	100	To 100% of grain
Rye	100	Corn	85	To 50% or 75% of grain
Oats.	100	Corn	75	To 33% of grain
Shorts.	100	Corn tankage	75 12	To 50% or 75% of supplement
Skim milk	100	Corn supplement	6 10	To 100% of supplement
Tankage	100	Protein supplement	75-90	To 100% of supplement

BROOD SOWS

Feed to Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity, Pounds	Extent To Which Substitution May Be Carried
Barley.	100	Corn	100	To 100% of grain
Wheat	100	Corn	100	To 100% of grain
Rye	100	Corn	100	To 100% of grain
Oats.	100	Corn	90	To 50% of grain
Skim milk	100	Protein supplement	10	To 100% of supplement
Tankage	100	Protein supplement	75-90	To 100% of supplement
Soybeans.	100	Protein supplement	90	To 100% of supplement

CHICKENS

Feed To Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity Pounds
Corn.	100	Wheat	100
Shorts.	100	Ground wheat	100
Tankage	100	Meat scrap	100
Skim milk or buttermilk .	100 gal.	Meat scrap	75
Dried milk.	100	Meat scrap	75
Condensed buttermilk. . .	100	Meat scrap	35-40
Soybean oil meal.	100	Meat scrap	100

SHEEP

Feed To Be Substituted	Quantity, Pounds	Feed To Be Replaced	Quantity, Pounds
Barley.	100	Corn	85
Wheat	100	Corn	95
Soybeans.	100	Soybean oil meal	95
Linseed oil meal. .	100	Soybean oil meal	100
Cottonseed meal . .	100	Soybean oil meal	100
Nonlegume hay . . .	100	Legume hay	50-75

SOYBEAN OIL MEAL

"Whenever a ton of tankage costs more than 1 1/3 times the cost of a ton of soybean oil meal, the meal might profitably replace all the tankage..... Or stated another way, as long as soybean oil meal costs less than 3/4 the price of tankage it is likely to prove cheaper than tankage as a supplement to corn for growing fattening pigs." U. of Ill.

Soybean oil meal is deficient in calcium and salt and should be supplemented with a mixture of--

2 parts ground agricultural limestone
2 parts ground bone meal
1 part common salt

Ratio of soybean meal to corn should be about--

1. at 50# - 1# meal to 2# corn
2. at 100# - 1# meal to 4# corn
3. at 200# - 1# meal to 12# corn

Amounts can be regulated by mixing with alfalfa meal or oats.

RELATIVE FEED VALUES

Value (not including cost of grinding) for--

When price of corn is--	Poultry	Sheep		Hogs and beef cattle	
	Wheat	Wheat	Barley	Wheat	Barley
	Cents	Cents	Cents	Cents	Cents
70 cents	75	75	56	79	56
75 cents	80	80	60	84	60
80 cents	86	86	64	90	64
85 cents	91	91	68	96	68
90 cents	96	96	92	101	72
95 cents	102	102	76	107	76
100 cents. . . .	107	107	80	112	80
105 cents. . . .	113	113	84	118	84
110 cents. . . .	118	118	88	123	88
115 cents. . . .	123	123	92	129	92
120 cents. . . .	128	128	96	123	96
125 cents. . . .	134	134	100	140	100

Feed Substitution Tables from "Farm Management" by R. R. Hudelson
By permission of The Macmillan Company, publishers.

USE OF WHEAT IN FEEDING FARM ANIMALS

HORSES

The general use of wheat as a feed for horses is not recommended.**

BEEF CATTLE

Wheat should be coarsely ground for cattle.

It is most satisfactory when fed as about one-half of the grain ration.

It may be fed in this proportion with corn, barley, or heavy oats.

When fed alone, it is difficult to keep cattle on feed.

Cattle do not like wheat as well as other grains.

When wheat is one-half of the grain ration, one-fourth less protein is required.**

Suggested rations in which wheat is the principal grain. (Daily Requirements.)

1. Wintering Bulls(1400#) *

(a)	Pounds
Crushed Wheat	10
Alfalfa or soybean hay	10
Corn or sorgo silage	30
(b)	
Crushed Wheat	5
Legume hay	25
Straw or stover	5

2. Wintering Breeding Cows (1000#) *

(a)	Pounds
Crushed Wheat	2
Oat or barley hay	10
Corn or sorgo silage	30
(b)	
Crushed Wheat	3
Alfalfa or soybean hay	10
Straw or corn stover	15

3. Wintering Stock Calves (400#) *

(a)	
Crushed Wheat	4
Pea-vine or Lespedeza hay	3
Corn silage	15
(b)	
Crushed Wheat	2
Soybean or peanut meal	1
Straw or stover	10
Legume hay	5

Wintering 2-year-old Steers *

(a)	Pounds
Crushed Wheat	2
Cottonseed cake	1/2
Corn silage	30
Straw	3
(b)	
Crushed Wheat	2
Cottonseed cake	1/2
Legume hay	12
Straw or stover	6

5. Fattening Yearling Steers In Feed Lot *

(a)	Pounds
Crushed Wheat	15
Alfalfa hay	10
Corn silage	12
(b)	
Crushed Wheat	16
Linseed Meal	2
Legume Hay	9

6. Fattening 2-Year-Old Steers in Feed Lot *

(a)	Pounds
Crushed wheat	14
Protein meal	2 1/2
Mixed hay	4
Corn or sorgo silage	14
(b)	
Crushed wheat	15
Protein meal	2
Mixed hay	8

7. Fattening 2-Year-Old Steers on Grass *

(a)	Pounds
Crushed Wheat (135 days) Grass pasture (135 days)	10
(b)	
Crushed Wheat (120 days)	8
Cottonseed cake (last 90 days)	2
Grass pasture (120 days)	

HOGS

Hogs will gain faster on wheat than on corn.

Hogs like wheat better than corn.

With wheat, one-half less protein supplement is needed than with corn.

Wheat will produce a better finished hog and a more desirable carcass.

Thrifty pigs fed wheat and the recommended protein supplement should make 100 pounds gain for every six bushels of wheat.**

How to Feed To Fattening Hogs

Grind wheat (coarse, medium, or fine)

Self-feed for most rapid gains.

Use 1 pound of protein supplement (soybean oil meal, 2 parts; tankage, 1 part) to 20 pounds of wheat.

Self-feed a mineral mixture of salt, finely ground limestone, and bone meal equal parts by weight.

Supply an abundance of water adjoining feeders or troughs.

Wheat may be fed in troughs, but care must be used to avoid waste.

There is no advantage in soaking wheat.**

How to Feed Brood Sows

Feed ground wheat alone to dry sows on good pasture. Self-feed a simple mineral mixture.

If in dry lot, feed 1 pound protein (soybean oil meal, 2 parts; tankage, 1 part) to each 20 pounds of wheat.

In dry lot, supply green leafy alfalfa hay or meal. **

Sows With Pigs

Self-feed or full-feed, using one pound protein feed (soybean oil meal, 2 parts; tankage, 1 part) to 20 pounds of wheat if pasture is available. If pasture is not available, feed one pound protein mixture to 14 pounds of wheat, and supply green colored leafy hay or meal.

For pigs weighing 50 to 75 pounds on August 1st, supply good pasture with a one-half feed of wheat, 20 parts, protein supplement 1 part (soybean oil meal, 2 parts; tankage, 1 part.) Self - feed simple mineral mixture. Full feed after January 1.**

Suggested feed mixtures in which wheat is the principal grain- (keep feed before hogs at all times)

1. Pigs from weaning to 100# in dry lot.*

(a)	
76 parts	Wheat
5 "	Tankage or fishmeal
6 "	Soybean meal
6 "	Linseed meal
6 "	Alfalfa meal
1 "	Mineral mixture
(b)	
65 parts	Wheat
17 "	Oats
5 "	Tankage or fishmeal
5 "	Alfalfa meal
7 "	Peanut meal
1	Mineral mixture

2. Pigs from weaning to 100# in pasture.*

(a)	
50 parts	Wheat
20 "	Barley
20 "	Oats
5 "	Tankage or fishmeal
5 "	Cottonseed meal
(Mineral mixture self-fed)	
(b)	
40 parts	Wheat
30 "	Corn
20 "	Barley
5 "	Tankage or fishmeal
5 "	Soybean meal
(Mineral mixture self-fed)	

3. Fattening hogs over 100# in dry lot.*

(a)	
45 parts	Wheat
21 "	Barley
20 "	Oats
5 "	Ground soybean hay
8 "	Soybean meal
1 "	Mineral mixture
(b)	
50 parts	Wheat
20 "	Corn
20 "	Barley
5 "	Tankage or fishmeal
4 "	Alfalfa meal

4. Fattening hogs over 100# on pasture.*

(a)	
47 parts	Wheat
47 "	Rye
6 "	Tankage or fishmeal
(Mineral mixture self fed)	
(b)	
50 parts	Wheat
22 "	Corn
20 "	Barley
8 "	Soybean meal
(Mineral mixture self-fed)	

5. Brood Sows and Boars*

When suckling pigs, provide all sow will eat. At other times limit feed to 1 to 2 percent of live weight)

(a)	
45 parts	Wheat
20 "	Corn
30 "	Oats
5 "	Tankage or fishmeal
(b)	
90 parts	Wheat
5 "	Tankage or fishmeal
5 "	Alfalfa-leaf meal
(Mineral mixture self-fed)	

DAIRY COWS

Wheat is an excellent feed to be used in the milk producing ration, or for growing heifers.

When used in a balanced grain ration as a substitute for one-half the corn, wheat is considered equal or even superior to corn.

Wheat should be rolled or coarsely ground and mixed with twice its weight of other feeds. When crushed wheat is mixed in this way with corn, barley, oats, or bran, and some high protein feed to form a balanced ration, it will not become gummy when chewed.

Ground wheat may be substituted pound for pound for not to exceed one-half of the corn, or one-fourth of the wheat bran in the ration.**

Suggested feed mixtures in which wheat is the principal grain. (Feed grain at rate of 1 pound for each 2½ pounds of milk or 3½ pounds of feed for each gallon of milk).

1. For cows on good pasture or good legume hay.*

1 part	rolled or finely ground wheat
1 "	Oats
1 "	Barley

2. For Cows on Legume Hay and Silage or Mixed Hay

(a) *	
1 part	Rolled or finely ground wheat
1 "	Oats
1 "	Gluten feed or dried brewers grain
(b)**	
30 parts	Coarsely ground wheat
30 "	Coarsely ground corn
25 "	Bran or coarsely ground oats
15 "	Cottonseed, linseed, soybean oil meal or cracked soybeans
4 1/2"	Mineral mixture 1/3 steamed bonemeal 1/3 ground limestone 1/3 salt

3. For Cows on Non-legume Hay, or Non-legume Hay and Silage

1 part	Rolled or finely ground wheat
1 "	Oats
1 "	Gluten feed or dried brewers grain
1 "	Soybean, cottonseed linseed or peanut oil meal

SHEEP

When fed to fattening lambs, it is more valuable combined with other grains. It should probably be coarsely ground.

Feed a protein supplement as soybean oil meal. If one-half the grain ration is wheat reduce the protein supplement one-fourth.

Suggested ration in which wheat is the principal grain. (Daily requirements)

1. Breeding Ewes *

(a)	Pounds
Wheat	1/2
Linseed meal	1/4
Corn silage	2
Straw or stover	1
(b)	
Wheat	1/2
Legume hay	2
Straw or stover	3

2. Fattening Lambs over 60# *

(a)	Pounds
Grain Mixture	
Wheat, 5 parts by weight Bran, 2 parts by weight Oats, 2 parts by weight Linseed meal, 1 part by weight	....1 1/2
Legume hay............	1 1/2

POULTRY

Wheat is one of the most palatable grains that can be fed to poultry. Pound for pound it has a slightly higher feeding value than corn.

Feed whole wheat as 1/2 or 2/3 of the grain ration for laying hens, pullets and turkeys.

Use coarsely ground wheat in home mixed rations as a substitute for shorts or wheat middlings.**

Suggested Feed Mixtures for Poultry (Feed All Fowls Will Consume)

FEED	Growing Mash		Laying Mash		Mash Fed With Scratch Grain		Turkey** Growing Mash
	a*	b**	a*	b**	Growing*	Laying *	
	Parts by Weight	Lbs.	Parts by Weight	Lbs.	Parts by Weight	Parts by Weight	Lbs.
Ground Wheat	50	100	70	200	25	45	100
Ground Corn	--	100	--	200	--		100
Ground Oats or Bran	--	100	--	165	10	10	50
Wheat Meddling	--	----	--	---	25	16	
Alfalfa Leaf Meal	10	16	10	25	10	10	30
Soybean Oil Meal	32	30	10	75	20	9	45
Dried Skimmed Milk or Dried Buttermilk					5	2	45
Meat Scrap or Fishmeal	3	30	2	75	4	2	45
Ground Limestone or Oyster Shell	1¼	--	4	--	2	3½	--
Steamed Bone Meal	2	--	2	--	1¾	1	--
Iodized Salt	¾	2	¾	4	--	--	2
Maganized Salt 1/	¾	2	¾	3	1	1	2
Vitamins A and D Feeding Oil	¼	--	½	--	¼	½	--

1/ Maganized salt prepared by mixing 100# of common salt and 3½# of technical anhydrous manganous sulphate.

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* U.S.D.A.
** Univ. Of Missouri

FEED BUDGET

LIVESTOCK FEED REQUIREMENTS CHART

This Amount of Livestock	Requires This Much Grain										This much Hay	
	With Protein Supplement						Without Protein Supplement					
Kind of Livestock	Corn		Small Grain		Supplement		Corn		Small Grain		Legume Hay	
	Per* Head	Total	Per* Head	Total	Per* Head	Total	Per* Head	Total	Per* Head	Total	Per* Head	Total

* Place in these columns the number of bushels or pounds you estimate will be required for each kind of livestock until October 1, the following year. The following amounts are considered a fair average requirement and are offered as a guide.

Kind of Livestock	Approximate Amount of Feed Required (per head**)					
	With Supplements			Without supplements		
	Corn	Small Grain	Supplement(f)	Corn	Small Grain	Hay (g)
Hogs to 250 lbs. (a)	16 bu.	6 bu.	75#	22 bu.	6 bu.	-----
Dairy Cows (and Bull) 250 lbs. B.F. (b)	10 bu.	22 bu.	280#	20 bu.	40 bu.	3T
Young Dairy stock (yearling basis, 2 calves = 1 yearling	8 "	10 "	110 "	--	--	1½T
Beef Cattle - Breeding herd	--	--	--	4 "		1½T
Young Cattle (2 calves = 1 yearling	--	--	--	6 "	7 "	1T
Feeding Cattle (to gain 350 to 400#)	40 "	--	250 "	45 "	--	1½T
Sheep - Ewes (including feed for lambs)	1¼ "	2½ "	15 "	--	--	1/5T
Feeding lambs (20-30# gain - dry lot)	2 "	--	15 "	2½"	--	1/10T
Horses (working 6 mo.) (c) 2 colts or 2 yearlings = 1 horse)	--	--	--	25 "	40 "	1 3/4T
Poultry (100 birds - 160 eggs) (d)	60 "	106 "	2280"	--	--	
Chickens to market or laying age (e)	9	15	1900	--	--	

** Adequate pasture for 5 mo. will furnish the other required feed.

(a) Includes feed for breeding stock and pigs lost, figured on basis of about 11 bushels of corn per 100 lbs. gain without supplement, or 7 bushels of corn with 30 lbs. of supplement.

(b) With mixed hay fed liberally. For each 50 lbs. butterfat increase, add 15 bushels of grain if no protein supplement is fed or add 10 bushels of grain and 50 lbs. of supplement if protein supplement is fed.

(c) If legume hay is fed very little protein supplement is required.

(d) Very few eggs can be expected without feeding some protein supplement. A 26-per cent protein mash is suggested. One hundred hens will eat a total of 20-30 lbs. of the grain and mash per day.

(e) For fryers use one-half amount of all feeds.

(f) When skimmed milk or butter milk is available 100# will replace approximately 7 pounds of protein supplement for hogs. Feeding poultry 1 gallon of skimmed milk per day for a year will replace 300# or 26.7 protein supplement.

(g) Where non-legume hay roughage must replace legume hay for milk cows, figure 4 times the protein listed and with mixed hay 3 times as much. Where no legume hay is fed increase the protein requirements 50 pounds for young beef cattle and 75 pounds for steers. Three tons of silage will replace approximately 1 ton of hay.

Illinois College of Agriculture; Iowa State College

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

FEED BUDGET

Kind of Crop	Acres	Est. yield per acre	Total Production	Rent Share	Feed from New Crops 1/	Carry-over	Total feed Available	Total 2/ Feed Reqm'ts.	Feed Balance or —	Prior Needs 3/	Feed to Buy 4/	Feed Available for Sale 5/
Woodlot												
Buildings, roads & waste												
Total acreage												

1/ The amount available for feeding after rent share is determined depends on the reserve for seed, and tho amount sold or sealed.

2/ Carried from front of sheet - Digest page 534.1

3/ Feed needed prior to the time the new crop becomes available. It will be necessary to buy sufficient feed to cover these prior needs if they cannot be drawn from carry over.

4/ "Prior needs" plus additional deficiency from feed balance column.

5/ "Prior needs" plus or minus the feed balance.

SOME POSSIBLE ADJUSTMENTS

when the feed budget reveals you are short of feed.

"1. Purchase additional feed.

2. Change cropping plan to produce more of needed feeds.

3. Adjust livestock program by changing management methods, time of marketing or by decreasing numbers."/*

PROTEIN SUPPLEMENTS

enough to balance farm grains

"Rations properly balanced with protein supplements require less grain, cut down feeding costs, and increase the efficiency of all productive livestock. Dairy cows receiving such rations produce more milk daily; poultry flocks produce more eggs; while hogs in dry lot require 15 to 25 percent less grain for 100 pounds of gain. For hogs on pasture there is not so marked a saving in grain, but gains are rapid and uniform, more pigs are marketed, and marketings timelier.

"Protein supplements should be purchased chiefly on the basis of a pound of protein. A 100-pound bag of 41-percent soybean meal, for example, contains 41 pounds of crude protein, and when selling at $2 furnishes protein at about 5 cents a pound. The cost per pound of crude protein in other supplements can be calculated in the same way.

HAY AND PASTURE

Plan for plenty

"If your present acreage of hay will not take care of your livestock, plan to seed an emergency hay crop, such as soybeans or a mixture of soybeans and Sudan grass. Either of these makes an excellent high-yielding hay crop and will supply part of the good legume hay which dairy cows particularly need.

"An acre of good pasture grazed by productive livestock can be as profitable as an acre of harvested grain. If your permanent and rotation pastures will not furnish enough good grazing, plan for some temporary pasture. Rye or other small grains sown in the fall furnish pasture in April or May; Sudan grass seeded in May makes excellent pasture for July and August.

"An acre of good rotation pasture in normal seasons will provide for one mature cow; good temporary pasture will carry one cow an acre or often two or more for about six weeks; while two acres of improved permanent pasture are usually needed for one cow. Two colts, 2 yearling cattle or calves, 5 sheep, 10 lambs, 15 feeding hogs, or 7 sows require about the same amount of pasture as one mature cow or horse."/**

OTHER REQUIREMENTS

of livestock expansion program

"Of course, many factors besides feed supplies will have an effect on increasing production. Adequate shelter and equipment are directly associated with feed supplies and rations in obtaining efficient production from livestock. No attempt should be made to expand the livestock program without providing:

1. A plentiful and clean water supply for all livestock.
2. Warm, dry and clean farrowing quarters for the brood sow.
3. Adequate housing for laying hens and chicks.
4. Feeding equipment well protected from filth and dirt so that all animals can get the feed they need.
5. Otherwise preventing disease losses and promoting conditions essential to the health and growth of livestock."/*

/* Iowa State College

/** U. of Ill., College of Agri

HOW TO BE A GOOD BOSS

1. Do not ignore. Impress each employee with the importance of his job and that he has a part in the proper operation of the farm.
2. Don't be afraid to praise a job well done.

An employee whose work is unnoticed comes to feel that his job is unimportant, and quickly his efficiency drops. If it is unimportant to the boss, it is certainly unimportant to the worker.

An indirect and effective method of praise is to ask an employee for his ideas. This gives him a sense of importance and helps sustain his ego. You may learn something, too.

3. Praise the work, not the worker. Praise in the presence of others if possible.

Nothing is more unfair to your workers, especially if they are young, than to allow them to continue to make mistakes.

4. Be sympathetic in listening to employees grievances. Hear his entire story.
5. Reprimands should always be constructive.
6. Do not hesitate to reprimand for fear it will make you disliked.

7. Begin all reprimands with a question. Let him tell his story first.
8. People are not all alike. Adjust your discipline to the individual.

A sensitive, high-strung person may be quite broken-up by a reprimand which would have no effect upon a thick-skinned or dull individual. Learn to know each worker through observation and experience. *No two persons are alike, nor can they be handled the same.*

9. Don't compare the work of one employee with that of another.

People don't mind their work being compared with a standard of performance, because it is impersonal. They do object to its being compared with that of another employee who has his faults, too.

10. Never criticize intentions; criticize methods.

Practically everybody has good intentions. Most persons don't mind methods being criticized, but they do not want their intentions questioned. It is bad to imply that a man is not loyal.

11. Sometimes you will have to reprimand publicly when an open violation of an important rule is committed.
12. Don't harbor resentment. After giving a reprimand, forget it. Try to find something good about the employee you can tell him at a later date.
13. Be consistent with your discipline.
14. Be fair with all employees. Give them all the same opportunities and discipline.
15. Don't be too lenient or too severe. Either is bad. Seek the middle ground.

GOOD WORK, JO!

THE BOSS ASKED MY ADVICE

HELP OTHERS-INSURE YOUR OWN PROGRESS

To discover whether you are *too lenient,* check the following:

1. Your workers will display a lax attitude toward the work in hand.
2. They will impose on your good disposition.
3. They will show a lack of respect for you.
4. Your reprimands will have little effect.
5. Your praise will lose it power to stimulate them.

If you are *too stern,* watch for these signals:

1. Your workers will avoid you.
2. They will appear sullen or stubborn.
3. Turn-over among your workers will be higher than normal.
4. Opposition to your work goals will be shown. This will show up in less work accomplished.

16. Be a leader in thought. Have ideas. Impress your workers.
17. Teach your workers. Tell, show, explain, follow through.

Instructing is telling, plus showing, plus try-out performance and follow-up. Let the worker do the job. You ask him questions. Let him ask you questions. Before putting him on his own, make sure *you know* that *he knows.*

18. Keep rules constantly before your workers.
19. Give your workers a "place in the sun." Men will work hard to merit approval.

Look upon your workers as potential candidates for better jobs. Don't try to keep a good man down for fear of losing him. Encourage him to improve his abilities whenever possible. You will benefit. He will benefit. All this creates loyalty toward you; the quality that you want to foster in your workers.

20. When giving even simple instruction, make employee feel the importance of the job, and his own importance in doing it.
21. Don't take yourself too seriously.
22. Set the example for your workers.

What you are, your workers will become. Set a good example for them at all times.

23. Be a talent scout.

When a man shows he has abilities that will enable you to give him greater responsibilities and more important tasks, use them if you can.

24. Insure your own business by developing the men under you.

Patience, tolerance, tact, and an honest desire to be a good boss, go a long way toward creating and maintaining good labor relations on the farm.

Selected from Cornell Bulletin 666

HOW TO BE A GOOD BOSS

SUPERVISING WOMEN WORKERS

Today, many women are employed on farms. They are doing splendid work in many ways. Supervising women, many agree, is a little harder than directing men. Some fundamental differences should be taken into consideration by every employer. Employers should lean over backwards to be impartial, impersonal, tactful, and courteous. Treat them all alike. Just as with men, be friendly and take an interest in each individual worker. However, with women, there is danger that they may misunderstand your interest.

Women attach more importance to personal relationships than do men. They want to work with a congenial group. Be sure to introduce the new woman employee to the men and women with whom she is to work.

Don't forget, however, that the same general principles that apply to handling men, apply to women as well.

Use Children and Inexperienced Help on Simpler Jobs

Insofar as possible, work should be planned so that experienced farm workers are kept busy at jobs which require experience and strength. If members of the family who are not able to do such jobs are available, they should be given the simpler, "time killing" jobs.

Boys from town are not able to do many jobs on the farm, but there are some they can do. They can be used to best advantage at simple hand work which requires no experience or at jobs where more than two workers are needed but where an experienced person can supervise and direct the work rather closely.

Women can help out by making trips to town for repairs.

Telephones can be used to check on whether repairs can be obtained and in calling to make arrangements for grinding feed, getting help, and so forth.

DO YOU -----?

Do you allow a new employee to repeat his mistakes without correcting him?

Do you leave a new man alone on a job he does not fully understand so long that he becomes discouraged?

Do you neglect to offer help and counsel to an employee occupied with a personal problem?

Do you endeavor to "jump in" and set the pace of workers without first discussing low output with them?

Do you say you are "too busy" to listen to an employee's troubles or grievances?

Do you neglect to speak a good word for a job well done?

Do you make much of a man's mistakes and keep still about his successes?

Do you take the credit for yourself of an employee's suggestions?

Selected from Cornell Bulletin 666
and Purdue Extension 298

Postpone Some Jobs

Productive enterprises make better use of short labor supplies. Unproductive work should be postponed until a more favorable time.

Combine Field Operations Where Possible

A section of harrow hooked on behind the plow to save a harrowing; a weeder used in combination with a tractor cultivator to eliminate one cultivation; or a drill hooked on behind a disk or a combine to save a separate trip over the field —all may enable one man to do much more work.

High Yields Make Labor Go Further

Increase your yields by using lime and fertilizer wherever needed, and by using adapted varieties of seed with a high germination test. Legumes, including soybeans, should be inoculated.

Table I. Productive Man Work[1] Units on Common Indiana Farm Enterprises

Kind of crop	*Acres or numbers on your farm*	*P.M.W.U.[1] per acre*	*Total P.M.W.U.[1]*
Field corn		1.0	
Field corn, cut and shocked		3.5	
Hybrid seed corn (unprocessed)		6.0	
Small grains		0.6	
Soybeans for grain		0.7	
Timothy or clover seed		0.3	
Alfalfa hay		1.6	
Clover, timothy, mixed hay		1.0	
Tomatoes		10.0	
Potatoes		6.0	
Sweet corn		4.0	
Tobacco		40.0	
Bearing orchard		10.0	
Nonbearing orchard		3.0	
Truck crops		15.0	
Dairy cows, per head		14.0	
Beef cows, per head		3.0	
Young cattle, per head		2.0	
Bull, dairy		5.0	
Bull, beef		4.0	
Feeder cattle, per head, per month, on feed		0.3	
Sows, per head (2 litters)		2.0	
Sows, per head (1 litter)		1.0	
Market hogs, per head		0.4	
Boar		3.0	
Ewes, per head		0.5	
Lambs, per head		0.25	
Laying flock, per 100 hens		20.0	
[2]Chicks, per 100 raised		5.0	
[3]Broilers, per 100 sold		2.5	

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[1] A productive man work unit is the amount of work accomplished at productive enterprises in a 10-hour day with average labor efficiency.

[2] Bought as unsexed chicks. Includes work on cockerels up to time of sale.

[3] Bought for meat production only.

Post List of Jobs to be Done

Lists of jobs to be done should be posted where everyone can find them. Then there is no excuse for anyone to wait for the "boss" to come home and tell him what to do.

Shorten Trips to Fields

Some crops require more trips to and from the field than others. Grow these crops near the buildings.

Make Full Use of Labor-Saving Machinery

Make the fullest possible use of available labor-saving machinery, such as tractors, combines, cornpickers, and pick-up hay balers.

Use Labor Saving Devices in Caring for Livestock

Mechanical methods and devices should be substituted for hand labor in caring for livestock whenever possible.

Guide to Labor Requirements

On farms where these and similar practices rather generally followed and where work is carefully planned in advance, each man can usually take care of 260-320 productive man work units. (See table 1.) On farms which have not followed these practices and where work is planned only from day to day, 200-260 productive work units is about all one man can handle in a year's time.

Summary

1. Plan work carefully well in advance.
2. Put off non-essential jobs.
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6. High rates of crop and livestock production makes labor go further.
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8. Large enterprises are more economical in the use of labor.
9. Adjust livestock enterprises to avoid labor peaks.
10. Use labor-saving devices in feeding and caring for livestock.
11. Pool hauling to save time and costs.
12. Plan work so that youngsters and inexperienced help can be used to save the time of experienced and able farm workers.

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How to Be a Good Boss

1. Do not ignore. Impress each employee with the importance of his job and that he has a part in the proper operation of the farm.
2. Don't be afraid to praise a job well done.

An employee whose work is unnoticed comes to feel that his job is unimportant, and quickly his efficiency drops. If it is unimportant to the boss, it is certainly unimportant to the worker.

An indirect and effective method of praise is to ask an employee for his ideas. This gives him a sense of importance and helps sustain his ego. You may learn something, too.

3. Praise the work, not the worker. Praise in the presence of others if possible.

Nothing is more unfair to your workers, especially if they are young, than to allow them to continue to make mistakes.

4. Be sympathetic in listening to employees grievances. Hear his entire story.
5. Reprimands should always be constructive.
6. Do not hesitate to reprimand for fear it will make you disliked.

7. Begin all reprimands with a question. Let him tell his story first.
8. People are not all alike. Adjust your discipline to the individual.

A sensitive, high-strung person may be quite broken-up by a reprimand which would have no effect upon a thick-skinned or dull individual. Learn to know each worker through observation and experience. *No two persons are alike, nor can they be handled the same.*

9. Don't compare the work of one employee with that of another.

People don't mind their work being compared with a standard of performance, because it is impersonal. They do object to its being compared with that of another employee who has his faults, too.

10. Never criticize intentions; criticize methods.

Practically everybody has good intentions. Most persons don't mind methods being criticized, but they do not want their intentions questioned. It is bad to imply that a man is not loyal.

11. Sometimes you will have to reprimand publicly when an open violation of an important rule is committed.
12. Don't harbor resentment. After giving a reprimand, forget it. Try to find something good about the employee you can tell him at a later date.
13. Be consistent with your discipline.
14. Be fair with all employees. Give them all the same opportunities and discipline.
15. Don't be too lenient or too severe. Either is bad. Seek the middle ground.

GOOD WORK, JO!

THE BOSS ASKED MY ADVICE

To discover whether you are *too lenient*, check the following:

1. Your workers will display a lax attitude toward the work in hand.
2. They will impose on your good disposition.
3. They will show a lack of respect for you.
4. Your reprimands will have little effect.
5. Your praise will lose it power to stimulate them.

If you are *too stern*, watch for these signals:

1. Your workers will avoid you.
2. They will appear sullen or stubborn.
3. Turn-over among your workers will be higher than normal.
4. Opposition to your work goals will be shown. This will show up in less work accomplished.

16. Be a leader in thought. Have ideas. Impress your workers.
17. Teach your workers. Tell, show, explain, follow through.

Instructing is telling, plus showing, plus try-out performance and follow-up. Let the worker do the job. You ask him questions. Let him ask you questions. Before putting him on his own, make sure *you know* that *he knows*.

18. Keep rules constantly before your workers.
19. Give your workers a "place in the sun." Men will work hard to merit approval.

Look upon your workers as potential candidates for better jobs. Don't try to keep a good man down for fear of losing him. Encourage him to improve his abilities whenever possible. You will benefit. He will benefit. All this creates loyalty toward you; the quality that you want to foster in your workers.

20. When giving even simple instruction, make employee feel the importance of the job, and his own importance in doing it.
21. Don't take yourself too seriously.
22. Set the example for your workers.

What you are, your workers will become. Set a good example for them at all times.

23. Be a talent scout.

When a man shows he has abilities that will enable you to give him greater responsibilities and more important tasks, use them if you can.

24. Insure your own business by developing the men under you.

Patience, tolerance, tact, and an honest desire to be a good boss, go a long way toward creating and maintaining good labor relations on the farm.

Selected from Cornell Bulletin 666

DOANE AGRICULTURAL DIGEST 1945

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

How to Be a Good Boss

SUPERVISING WOMEN WORKERS

TODAY, many women are employed on farms. They are doing splendid work in many ways. Supervising women, many agree, is a little harder than directing men. Some fundamental differences should be taken into consideration by every employer. Employers should lean over backwards to be impartial, impersonal, tactful, and courteous. Treat them all alike. Just as with men, be friendly and take an interest in each individual worker. However, with women, there is danger that they may misunderstand your interest.

Women attach more importance to personal relationships than do men. They want to work with a congenial group. Be sure to introduce the new woman employee to the men and women with whom she is to work.

Don't forget, however, that the same general principles that apply to handling men, apply to women as well.

Use Children and Inexperienced Help on Simpler Jobs

Insofar as possible, work should be planned so that experienced farm workers are kept busy at jobs which require experience and strength. If members of the family who are not able to do such jobs are available, they should be given the simpler, "time killing" jobs.

Boys from town are not able to do many jobs on the farm, but there are some they can do. They can be used to best advantage at simple hand work which requires no experience or at jobs where more than two hands are needed but where an experienced person can supervise and direct the work rather closely.

Women can help out by making trips to town for repairs.

Telephones can be used to check on whether repairs can be obtained and in calling to make arrangements for grinding feed, getting help, and so forth.

DO YOU ----?

Do you allow a new employee to repeat his mistakes without correcting him?

Do you leave a new man alone on a job he does not fully understand so long that he becomes discouraged?

Do you neglect to offer help and counsel to an employee occupied with a personal problem?

Do you endeavor to "jump in" and set the pace of workers without first discussing low output with them?

Do you say you are "too busy" to listen to an employee's troubles or grievances?

Do you neglect to speak a good word for a job well done?

Do you make much of a man's mistakes and keep still about his successes?

Do you take the credit for yourself of an employee's suggestions?

Selected from Cornell Bulletin 666
and Purdue Extension Bulletin 298

Postpone Some Jobs

Productive enterprises make better use of short labor supplies. Unproductive work should be postponed until a more favorable time.

Combine Field Operations Where Possible

A section of harrow hooked on behind the plow to save a harrowing, a weeder used in combination with a tractor cultivator to eliminate one cultivation; or a drill hooked on behind a disk or a combine to save a separate trip over the field —all may enable one man to do much more work.

Make Full Use of Labor-Saving Machinery

Make the fullest possible use of available labor-saving machinery, such as tractors, combines, cornpickers, and pick-up hay balers.

Table I. Productive Man Work[1] Units on Common Indiana Farm Enterprises

Kind of crop	*Acres or numbers on your farm*	*P.M.W.U.[1] per acre*	*Total P.M.W.U.[1]*
Field corn	—	2.0	—
Hybrid seed corn (unprocessed)	—	6.0	—
Small grains	—	1.0	—
Soybeans for grain	—	0.8	—
Alfalfa or clover seed	—	0.3	—
Tomatoes	—	11.0	—
Potatoes	—	9.0	—
Sweet corn	—	4.0	—
Tobacco	—	40.0	—
Bearing orchard	—	10.0	—
Nonbearing orchard	—	3.0	—
Truck crops	—	15.0	—
Dairy cows, per head	—	14.0	—
Beef cows, per head	—	3.0	—
Young cattle, per head	—	2.0	—
Feeder cattle, per head, per month on hand	—	0.2	—
Sows, per head	—	2.0	—
Market hogs, per head	—	0.5	—
Ewes, per head	—	20.0	—
Laying flock, per 100 hens	—	20.0	—
[2]Pullets, per 100 raised	—	6.0	—
[3]Broilers, per 100 sold	—	2.5	—

[1] A productive man work unit is the amount of work accomplished at productive enterprises in a 10-hour day with average labor efficiency.

[2] Bought as unsexed chicks. Includes work on cockerels up to time of sale.

[3] Bought for meat production only.

Post List of Jobs to be Done

Lists of jobs to be done should be posted where everyone can find them. Then there is no excuse for anyone to wait for the "boss" to come home and tell him what to do.

Shorten Trips to Fields

Some crops require more trips to and from the field than others. Grow these crops near the buildings.

High Yields Make Labor Go Further

Increase your yields by using lime and fertilizer wherever needed, and by using adapted varieties of seed with a high germination test. Legumes, including soybeans, should be inoculated.

Guide to Labor Requirements

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FARM LABOR

HOW TO INCREASE EFFICIENCY

Good farm management implies efficient man management. The objective of the farm manager is to bring farm labor and farm resources together for the purpose of producing farm products at a profit. Maximum profits can be obtained only when the farm manager employs the optimum amount of farm labor to develop the farm resources available.

Labor efficiency is closely related to machinery and power efficiency. Modern farm machinery is rapidly reducing the man hour requirements of most farm crops. Even such jobs as cotton picking and cotton and beet chopping are yielding to mechanization.

MAN HOUR REQUIREMENTS PER ACRE -- (MOST COMMON EQUIPMENT)

CROP	1909	1936	1936 - best equipment
Corn	16.2 hrs.	12.4 hrs.	6.2 hrs.
Wheat	8.7 hrs.	2.1 hrs.	1.4 hrs.

Careful farm planning which provides a definite but flexible program of action is essential if the farm plant is to operate at capacity at all times. It is doubly important to plan carefully when price levels are declining because labor costs decline more slowly than commodity prices.

There are two phases to farm planning.

1. Long-time planning which outlines the general crop rotations; the livestock systems; and the broad policies guiding the labor, power and improvement programs.

2. Short-time planning which applies the long-time program to the current situation in such a way as to most effectively utilize available land, improvements, feed, labor, power and equipment.

Farm managers are vitally concerned with both phases of farm planning. It is only as short-time plans become part of the long-time plan that labor, power and farm resources can be used most efficiently. Here are some adjustments that should be considered.

CROPS- Diversify and alter culture practices to avoid peak labor and power requirements and use resources to full capacity.

1. Use available man hours on those crops which produce the largest amount of digestible nutrients per hour or per acre under normal conditions.

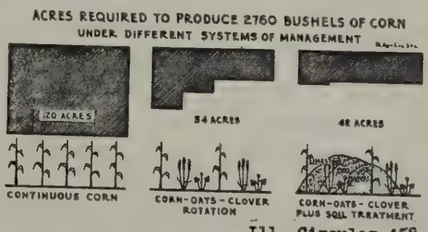
Yields of feed crops necessary to provide the same amount of productive digestible nutrients per acre.*

Productive digestible nutrients**	Grain yield per acre				
	Corn	Barley	Oats	Rye	Wheat
lb.	bu.	bu.	bu.	bu.	bu.
3,000	50	67	97	50	47
2,400	40	53	77	40	37
1,800	30	40	58	30	28
1,200	20	27	39	20	19
	Roughage yield per acre				
	Alfalfa	Clover	Soybean	Timothy	Silage
	tons	tons	tons	tons	tons
3,000	3.6	3.5	3.8	4.3	9.6
2,400	2.9	2.8	3.1	3.4	7.7
1,800	2.2	2.1	2.3	2.6	5.8
1,200	1.5	1.4	1.5	1.7	3.9

*From C. F. Huffman, Dairy Section, Michigan State College.
**Assuming that the stover and straw are fed.

2. Reduce acreage of crops with high labor requirements particularly if this can be done without reducing production per available man hours.

3. Rotate and fertilize crops to secure maximum efficiency in crop production.


ACRES REQUIRED TO PRODUCE 2760 BUSHELS OF CORN
UNDER DIFFERENT SYSTEMS OF MANAGEMENT
120 ACRES
54 ACRES
48 ACRES
CONTINUOUS CORN
CORN-OATS-CLOVER ROTATION
CORN-OATS-CLOVER PLUS SOIL TREATMENT

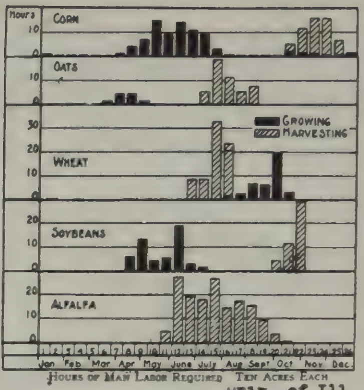
Ill. Circular 458

4. Devote more land to permanent pasture and meadows if this can be profitably utilized for livestock.

5. Where practical select crops which have complimentary rather than conflicting labor requirements.

6. Do not plow good pasture or meadows. They will make a crop without additional hours of man labor and power.

7. Save permanent blue grass pasture for winter grazing. Keep cattle on lespedeza and small grain pastures and other summer pasture until late in the fall. (See page 176.1).



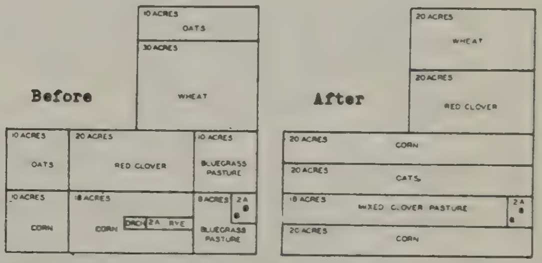
Univ. of Ill.

8. Fall and winter plow where erosion is not a problem.

9. Drill soybeans to speed planting and also eliminate the necessity of later cultivation.

10. Make farm lease arrangements as early as possible to permit operator to prepare for the coming year.

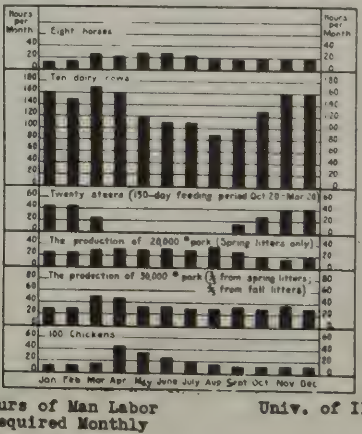
11. Reorganize the farm into larger fields and longer rows when possible. Reduce long trips to the field by cultivating fields close to the buildings.



Revision of Field System - 120 acre Clinton Co. Ill. Farm

LIVESTOCK-Increase livestock efficiency by securing more economical gains and by taking livestock to the feed instead of taking the feed to the livestock.

1. Adjust the livestock program to conflict less with crop production. Where there is a choice, select classes of livestock whose labor requirements are as complimentary as possible.



Hours of Man Labor Required Monthly

Univ. of Ill.

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

FARM LABOR - HOW TO INCREASE EFFICIENCY

LIVESTOCK cont'd.

2. Hog down corn.

3. Make full use of silage. Iowa records show that 1/3 less land is required to feed steers to market weight when silage supplements a balanced ration.

4. Store feed convenient to feeding areas. Plan to build the feed racks around stacked hay where possible.

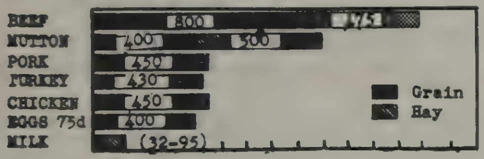
5. Graze off meadows where practical, and save costs and labor of hay harvest.

6. Use electric fences to secure full use of stubble and corn stalk fields.

7. Use self-feeders to the maximum.

8. Feed grain to classes of livestock which will produce the greatest net food returns.

Pound Feed Required Per 100# of Product



PROPORTION OF FOOD EATEN RETURNED FOR HUMAN USE.[1]

	Per cent of protein returned.		*Per cent of energy returned.*		
	Of total food	Of digestible protein	Of total food	Of digestible food	Of production value of food
Dairy herds	14.5	22.9	10.0	15.1	33.8
Steer	6.4	11.8	4.7	6.9	14.8
Poultry flock	14.5	18.6	6.4	7.5	12.6
Hog	10.2	13.2	15.1	17.5	29.9

[1] Eckles and Warren, Dairy Farming, p. 8.

9. Make minimum use of winter roughage and maximum use of pasture for cattle and sheep.

10. Provide plenty of water at all times. Keep it heated in the winter time.

11. Move feeding floor, shelters, hog houses, etc., to clean ground frequently. This will increase livestock efficiency and production per man hour by preventing loss due to filth diseases.

12. Prevent unnecessary loss by vaccinating, deworming, etc. Deworming makes unthrifty pigs if done late.

13. Plan the breeding program so that it does not interfere with other work. (See Digest page 244)

14. Provide heated brooders for early pigs to reduce labor requirements and insure more pigs per litter.

15. Push pigs from start to secure most economic gain.

Relationship of Weaning Weight to Attained Market Weight at Six Months

Weaning Weight 8 weeks	Attained Weight 6 months
15-20 pounds	189 pounds
25-30 pounds	203 pounds
40-45 pounds	228 pounds
50-55 pounds	254 pounds

Univ. of Mo. Data

16. Carry hogs to heavier weight to secure maximum use of labor and available equipment.

17. Use milking machines for dairy enterprises wherever practical. For all machine milking use the 3-minute rapid milking system. (See Digest Page 281)

18. Extend the average life of the commercial dairy cow by holding mastitis and other diseases to a minimum. Make the mastitis control program part of the regular milking routine. (See Digest Page 281)

LABOR-POWER-MACHINERY - Use efficiently and at capacity.

1. Classify farm work according to labor requirements. Use boys and women on lighter work, inexperienced help on simpler jobs.

2. Explain thoroughly, demonstrate, and then closely supervise any new or unusual tasks. Follow up later to be sure that the job is done right. (See Digest Page 573)

3. Have materials and equipment ready to go well in advance.

4. Use labor, power and equipment on the best land first to insure highest returns per unit of labor or power.

5. Prepare seed bed thoroughly, thus reducing the number of cultivations by killing weeds before they get started.

6. Perform two or more operations at once. For example tie a harrow or cultivator behind a disk or drill.

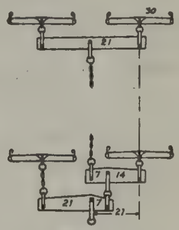
7. Add lights to tractors and equipment to permit more hours of use during peak seasons.

8. Reduce time lost in turning by working around the field with grain drills and other large equipment.

9. Keep tractor in first class repair at all times and lubricate thoroughly.

10. Check and repair all machinery in slack seasons and on rainy days. Keep operating machines in first class repair and well oiled.

11. When horses are used make full use of multiple hitches. Additional power equivalent to a fifth horse can be secured by using the simple 4 horse hitch illustrated here.



Missouri College of Agriculture.

12. Use enough horses to keep equipment moving. Arrange to change teams if necessary to do this.

13. Plan to use horses that are fully broke. Using unskilled labor with untrained horses may prove disastrous to farm machinery and harness. High priced labor held up while a colt rests is too expensive.

14. Use custom machinery to the fullest.

15. Substitute machines for man power whenever possible even at the cost of machinery efficiency, if man hours saved can be better and profitably used elsewhere.

16. Cooperate with neighbors in ownership of heavy machinery. Cooperative groups will get first call on available farm machinery.

17. Hire skilled carpenters for building repairs.

18. Hold fence and building maintenance to the minimum. Make necessary repairs during the winter or on rainy days, but before they are needed.

19. Remove fire hazards.

20. Reduce land maintenance such as clearing brush and fence rows to the minimum.

21. Maintain the drainage system in top condition in order to secure maximum numbers of days in the field.

22. See that all living quarters for hired help and tenants are conducive to good health, thus insuring minimum loss of time due to sickness.

23. Make as few tenant changes as possible.

24. Be a good boss. Help your men to succeed and never try to hold a good man down. Keep wage scales in line with the value of services rendered. (See Digest Page 573)

FARM MANAGEMENT TERMS AND DEFINITIONS

1. *Farm management* is the science of the organization and operation of farms. It considers the effectiveness of different sizes of operating units and of combinations of productive resources, enterprises, and practices for operating units; programs of adjustment for agricultural areas; and the impact of public policies and programs on economic activities on farms.
2. *Farm organization* is the selection and arrangement of land, labor, equipment, crops to be grown, and livestock to be kept in the farm operating unit.
3. *Farm practice* is a technique or method used in farming operations.
4. *Size of business* is the magnitude of the farm operations on a farm in a given year measured in terms such as an important item of farm property, farm receipts, or man work units.
5. *A farm* is one or more tracts of land, including improvements, operated as a unit for agricultural production.
6. *Crop land* is that part of the farm area normally used for the production of crops, or for summer fallow or rotation pasture.
7. *Tillable land* is that part of the farm area which can be used for cultivated crops without additional clearing, draining, or irrigating.
8. *Acres in crops* is the area of land on which crops, exclusive of permanent pasture and woods, are either growing or harvested in a year.
9. *Acres of crops* is the total acreage of crops growing or harvested in a year, exclusive of annual crops planted for harvest during the following year. It may be larger than the acres in crops because of the production of more than one crop on a part or all of the cropland.
10. *A farm enterprise* is a branch of the farm business, such as a crop or a class of livestock.
11. *Competitive enterprises* are branches of the farm business which require the use of one or more of the farmer's productive resources at the same time and thus tend to limit each other in the farming system.
12. *Supplementary enterprises* are branches of the farm business which fit together without serious conflict in the use of the farmer's productive resources.
13. *Complementary enterprises* are branches of the farm business which are contributive, each to the other, in the use of the farmer's productive resources.
14. *Type of farming* is a form of organization and methods of operation which are fairly uniform on a group of farms.
15. *A type-of-farming area* is an area in which the physical and economic conditions related to agriculture are much the same throughout and in which one type of farming or pattern of types of farming is dominant.
16. *A system of farming* is the detailed organization, methods of operation, and practices used on a particular farm.
17. *Commercial farming* is farming with the primary purpose of producing farm products for sale.
18. *Part-time farming* is a combination of farming with other occupations in which the operator devotes a considerable part of his time to non-farm occupations.
19. *Self-sufficing farming* is farming in which the principal occupation and the primary purpose are the production of farm products for use by the farm family.
20. *Diversified farming* is farming in which there are several sources of farm income.
21. *Specialized farming* is farming in which a major part of the income is normally derived from one enterprise.
22. *Intensive farming* is farming in which comparatively large amounts of labor and working capital are used per acre of land.
23. *Extensive farming* is farming in which comparatively small amounts of labor and working capital are used per acre of land.
24. *A family farm* is one which is operated largely or entirely with the labor of the operator and his family.
25. *A farm budget* is a plan for the organization and operation of a farm for a specified period of time, including a detailed statement of the anticipated gross income, expenses and net income.
26. *A farm inventory* is a list of the amounts and value of all items of farm property as of a given date.
27. *Farm capital* is the land with such permanent improvements as are ordinarily transferred with the title to the land, livestock, equipment, feed, other supplies, and cash constituting together a farm operating unit.
28. *Fixed farm capital* is the land with such permanent improvements as are ordinarily transferred with the title to the land.
29. *Working farm capital* is the livestock, equipment, feed, other supplies, and cash used in the operation of the farm business.
30. *Gross farm income* is the sum of the annual receipts from sales, miscellaneous farm receipts, increase in farm inventory, and the value of living from the farm furnished to the operator, his family, and hired laborers.
31. *Farm expenses* is the sum of the annual cash operating expenses, value of unpaid family labor, decrease in farm inventory, depreciation, and the value of living from the farm furnished to hired laborers.
32. *Net farm income* is the compensation, including the value of family living from the farm, for farm capital and for labor and management of the operator. It is derived by deducting farm expenses from gross farm income.
33. *Net family farm income* is the compensation, including the value of family living from the farm, for farm capital, labor and management of the operator, and labor of unpaid members of the operator's family. It is derived by deducting farm expenses, exclusive of value of unpaid family labor, from gross farm income.
34. *Operator's earnings* is the compensation, including the value of family living from the farm, for operator's labor and management. It is derived by deducting an interest charge for the use of farm capital from net farm income.
35. *Family earnings* is the compensation, including the value of family living from the farm, for operator's labor and management and for labor of unpaid members of the operator's family. It is derived by deducting an interest charge for the use of farm capital from net family farm income.
36. *Farm capital earnings* is the compensation for farm capital. It is derived by deducting the value of operator's labor from net farm income. If expressed in percentage, it should be designated "per cent earnings of farm capital."
37. *Value of operator's labor* is the farmer's estimate of what he would have to pay another person in cash and in kind to do the labor performed by him.
38. *Unpaid family labor* is labor, used in conducting the farm business, which is furnished by the members of the farm family, other than the operator, for which no direct wage is paid. Its value is determined on the basis of the amount of additional labor the operator would have to hire at current wages to carry on the same size business had the family labor not been available.
39. *Interest charge* for use of farm capital is an estimated charge for the use of the farm capital, based on the current rate on well-secured loans.
40. *Family living* from the farm is the farm value of farm-grown food, fuel, and other products used by the family plus the value of the use of the farm dwelling.
41. *Board of hired labor* is the cash expense incurred for subsistence of hired laborers living with the farm family.
42. *Depreciation* is the decrease in value of farm capital resulting from age, use, and obsolescence.
43. *Man equivalents* is the total months of labor, including the operator, divided by 12.
44. *Man work unit* is the average amount of work accomplished by one man in 10 hours at the usual farm tasks under ordinary conditions.
45. *Unit requirements* for farm operations are the quantities of, or the expenditures for, the factors of production used under given conditions for a unit of farm production, for a period of farm maintenance, or for the operation of a unit of farm power.
46. *Standard requirements* for farm operations are reasonably attainable standards of achievement in the quantities of, or the expenditures for, the factors of production used, under given conditions for a unit of farm production, for a period of farm maintenance or for the operation of a unit of farm power.
47. *An animal unit* is one mature horse or cow, or the equivalent in other livestock, based upon the amount of feed consumed, manure produced, or other appropriate conversion factors.
48. *Feed unit* is one pound of corn, or its feed-value equivalent in other feeds.
49. *Crop yield index* is a percentage ratio of the yield per acre of one or more crops on a given farm to the yield per acre of the same crop or crops on a group of farms. If more than one crop is included in the index, the yield of each crop is weighted by acres, man work units, or some other measure.
50. *Livestock index* is a comparative measure of production or returns per animal, or unit of feed fed, of one or more classes of livestock on a given farm or group of farms, expressed as a percentage of some specified base.
51. *Diversity index* is a measure of the number and relative sizes of farm enterprises in the farm business.

JOURNAL OF FARM ECONOMICS, Vol. XXIII, No. 1, February, 1941
Report of the Committee on Definitions of Terms in Farm Management

Professional Farm Management Standards
of the
American Society of Farm Managers and Rural Appraisers

The varied methods and degrees of efficiency of the host of individuals and organizations undertaking to manage farms and set values on land makes it timely and expedient that some statement be made of what constitutes acceptable farm management and appraisal services. Clients deserve to know what they have a right to expect when they employ the services of a farm manager or rural appraiser. There is need of standards by which mere rent collectors and roadside appraisers can be differentiated from professional farm managers and rural appraisers.

The following report is an attempt, briefly and concisely, to show what are acceptable standard methods and practices.

Ethics

Public confidence in the work of farm managers and rural appraisers can be obtained only by the members of the profession at all times strictly observing the best business and professional ethics. The code of ethics to which all accredited members definitely subscribe is hereby made a part of these Professional Standards and should be followed by all managers and appraisers.

Professional farm management embodies such procedure as the following:

Management Contract With Clients

All management agreements between land owners and farm managers should be in writing and in sufficient detail to avoid any possibility of misunderstanding. The agreements should include the following:

- (a) Date of starting service, duration of contract, and method of termination.
- (b) Legal description, acreage and approximate location of land concerned.
- (c) Services to be rendered.
- (d) Method and authorization for handling receipts and disbursements.
- (e) Compensation, amounts and dates of payment.

Farm Management Plan

A farm management plan in writing should be set up in assuming the management of each property or group of similar properties managed for a client.

Plans for individual farms should include recommendations covering such items as the following:

- (a) Field arrangement and rearrangement
- (b) Soil treatment
- (c) Drainage, terracing, etc.
- (d) Crop rotations and land use
- (e) Livestock program
- (f) Improvements
- (g) Type of operation, direct or tenant
- (h) Disposition of products
- (i) Budget
- (j) Accounting system

The perfected plan to be submitted to and approved by the client.

Farm Visits

Efficient farm management requires that farm inspections be sufficiently frequent and thorough to successfully execute the plan.

Reports

Detailed written reports should be submitted frequently enough to keep the client fully advised of all essential facts in regard to progress under the management plan. This normally includes several current reports, an annual, and one or more summary reports.

Such reports should include at least an annual inventory and a financia statement covering the year's business.

Operating Contracts

Farm operating contracts (leases) should be written.

Farm tenancy is recognized as a permanent method of land operation. It is therefore important that operating contracts encourage a constructive type of tenantry.

Short land tenure should be discouraged but operating contracts should be on an annual basis with provisions which encourage renewal. The contracts should induce co-operation in permanent improvements by the owner and operator. There should be a plan of compensation to the operator in case the contract is terminated before major residual benefits have been exhausted, provided such improvements have been authorized by the land owner. Similar protection should be provided for owners.

Contracts following the above principles, if properly supervised, should contribute to the upbuilding of American agriculture. This will lead to a higher farm income for owners and operators, and should aid in insuring a satisfactory standard of living for both.

Code of Ethics of the American Society of Farm Managers and Rural Appraisers

In consideration of my membership in the American Society of Farm Managers and Rural Appraisers and more especially in consideration of the title now being conferred on me of,

Accredited——————————A.S.F.M. and R.A.

I hereby pledge to so conduct my business and professional activities that they will be a credit to myself and the organization which has honored me with its membership. I specifically subscribe to, and pledge my unqualified observance of the Code of Ethics of the Society; which is as follows:

Procedure

1.—It is unethical to represent conflicting interests; except by express consent of all concerned given after a full disclosure of the facts to both a buyer and seller of a commodity or service.

2.—It is unethical to accept employment without first disclosing all previous and present relationships that may have been had with the property or case.

3.—It is unethical to issue a report or an appraisal without fully disclosing any interest, present or contemplated, of the maker, his associates or those concerned in having it made.

4.—It is unethical to make reports or appraisals in more than one section or division, thus making it possible to use only one part in a manner contrary to the facts. When more than one report is necessary to reveal all essential features this fact should be shown on both the original and supplementary reports.

5.—It is unethical to make an appraisal or report under conditions so adverse that it is impossible to secure all pertinent and essential facts.

6.—It is unethical to reveal the contents of reports, appraisals, or any important facts in regard to the business of a client, unless release from this obligation is obtained from the client or by due process of law. Releases should be in writing.

7.—Hypothetical appraisals and reports should be avoided but if and when made should clearly, completely, and prominently state any hypothesis assumed and fully describe all existing conditions.

New Business

8.—It is unethical to use advertising in a manner which tends to be misleading in its implications or claims.

9.—It is unethical to employ or otherwise use the services of a representative whose primary activity is the securing of new business rather than in rendering service to clients.

10.—It is unethical for members to directly or indirectly and knowingly solicit clients of other members of the profession for the purpose of obtaining business.

11.—It is unethical to accept work for which:

- (a) The compensation is contingent upon the reporting of predetermined findings or a specified amount of value.
- (b) The amount of compensation is set by a percentage of the value or is contingent on any other opinion or features of the appraisal or report.
- (c) A bonus, favor or any other special inducement is offered.

Contingent fees lead to many abuses and should be avoided.

Funds—fees

12.—It is unethical to so handle the funds, or other personal property of clients, that its identity may be obscured or lost, or to use them in any manner for personal gain.

13.—It is unethical to so charge for professional services that these charges reflect upon the good name of the profession. In determining the amount of the remuneration it is proper to consider:

- (a) The time, labor, skill and training required to properly discharge the assignment
- (b) The customary charge of competent appraisers and managers for similar work
- (c) The value of the property and the benefits resulting from the use of the services
- (d) The extent of the employment whether casual or for a long period.

No one of these considerations in itself is controlling. The safest and most satisfactory rule is to tell a client at the time of employment, if possible, what the charge will be, or how it will be computed.

Managers and appraisers should expose within their ranks without fear or favor corrupt or dishonest conduct and strive at all times to uphold the honor and maintain the dignity of the profession. It is their duty to at all times stand for the best in our moral and civil laws. The professional Farm Manager and Rural Appraiser will find his highest honor in a deserved reputation for being an honest, patriotic and loyal citizen and for his fidelity to private trust and public duty.

I understand that the violation of any of these ethics and other similar rules of good conduct may cause my title to be revoked.

Witness my hand and seal this——day of————, 194————————

Subscribed and sworn to before me
this——day of————194————————

Notary Public

Journal of the American Society of Farm Managers and Rural Appraisers

From Farm Management Standards of the American Society of Farm Managers and Rural Appraisers.

THE EMPLOYMENT OF FARM MANAGEMENT SERVICE IMPLIES:—

A. *That the MANAGER shall* undertake to the best of his ability to perform such of the following services as the particular farm and situation may require and the best interests and desires of the Farm Owner (the Client) may dictate:

1. Following initial and subsequent inspections and studies of each property, prepare

(a) Accurate and complete reports of present organization, physical condition, operating personnel, and environmental factors affecting operation of the farm (except when farm is under direct operation of client being reported to).
(b) Plans of field arrangement, crop plans, soil treatment, drainage and adding to, rehabilitating or maintaining improvements.
(c) Select a type of operation—hired or tenant, livestock, share crop, cash, etc.
(d) Estimate cost of necessary added capital investment and working capital.
(e) Submit plans, recommendations, and needs to owner for consideration and approval.

2. Secure tenant or hired operator and make written lease or labor contract in keeping with type of operation selected covering the agreements entered into between the tenant or hired operator and the farm owner.

3. Supervise the institution and carrying out of the plan of operation adopted.

4. Supervise the work of the tenant or operator in:

(a) The selection of suitable and adapted seeds;
(b) Inoculation of legumes;
(c) Proper soil preparation and tillage;
(d) Weed control;
(e) Care, harvesting, storage, marketing of crops;
(f) Selection, care, feeding, handling, and marketing of livestock in which farm owner may have an interest;
(g) Maintenance and improvement of the farm, buildings, fences, drainage system, etc.;
(h) Selection of proper fertilizer;
(i) Hauling manure at proper time and to proper fields;
(j) Keeping the premises clean, brush cut, etc.;
(k) Getting and keeping "for sale" farms in best possible sales condition;
(l) Carrying out other agreements to which the tenant or operator is obligated.

5. Visit the farm as often as occasion requires for carrying out his duties (but not any arbitrarily set number of times per year).

6. To make purchases required on account of the farm owner as cheaply as possible, the farm owner receiving directly in price reductions the full benefit of any wholesale or quantity purchasing power the manager may possess.

7. Make every reasonable effort to collect rentals due the farm owner.

8. Sell and collect for crops and livestock and/or livestock products belonging to the farm owner at such time and price dictated by the best judgment of the farm manager subject to any express directions to the contrary given manager by the farm owner.

9. Carry out plans and budgets approved by the owner, or on special instructions from him, using funds belonging to the farm owner collected by the manager or advanced by the farm owner,

(a) To contract for, superintend, and pay for improvements and repairs approved by farm owner;
(b) to secure statements and pay special taxes and assessments;
(c) to secure fire, hail and windstorm insurance on buildings and personal property on farm belonging to farm owner and pay premium on same. (The manager not to participate in any agent's commissions);
(d) to pay expenses incidental to the operation of the farm.

10. Furnish the owner with reports frequently enough to keep the farm owner fully advised of all essential facts regarding conditions on the farm and progress being made.

11. Furnish the farm owner with statemen current receipts and disbursements accompanied by remittance for net balance remaining in owner's account at such times as requested by owner. (The manager should be desirous of having as little money belonging to farm owner in his possession as is possible and still provide sufficient money to take care of current needs.)

12. Represent owner in adjusting insurance losses, attending ditch hearings, adjusting line fence difficulties, and in all other projects or situations which may affect the interests of the owner of the farm by virtue of that ownership.

B. *That FARM OWNER or CLIENT shall*:

1. Give the manager express power and authority,

(a) to superintend and manage the farm;
(b) to make collections and disbursements in keeping with the current management plan and budget for the farm;
(c) to take care of emergency needs not anticipated in plans and budgets already approved by the owner, (such as repair of pumps without previous consent of owner), provided the expenditure does not exceed $.................. (the amount to be agreed upon at the time service is employed).

2. Cooperate with the manager in promptly considering plans, leases, etc. submitted to him by the manager, rejecting, approving or executing and returning same to manager.

3. To promptly advance money needed for current operations of the farm in accordance with budget approved, or approved by owner under B-1-c.

4. Not assign, mortgage, or in any way dispose of issues, rents, or profits arising out of said land without giving the manager written notice thereof.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

THE AMERICAN SOCIETY OF FARM MANAGERS AND RURAL APPRAISERS

An organization of trained men in the United States and Canada devoted to the management of farms and the appraisal of rural properties.

The Society is devoted to such objectives as—

(a) The development and improvement of methods of farm management by practical operation and application of the results of research.

(b) Constant efforts to improve the technique of making sound rural appraisals.

(c) Promoting a more general extension of sound farm management and rural appraising practices.

(d) The establishment of a strict Code of Ethics and the encouragement of high ethical standards of conduct.

(e) Full cooperation with all agencies striving to improve American rural life on a sound basis.

(f) Improving the condition of the individual farm operator or owner by the application of efficient farm management practices, and the exercise of sound procedure in land evaluation, and the wise use of farm credit.

(g) Support of all agricultural education and research agencies.

(h) Publication of a Journal devoted to articles representing advanced thinking on farm management and rural appraising subjects.

(i) Conducting examinations and accrediting men who meet severe requirements as Accredited Farm Managers and Accredited Rural Appraisers.

HISTORY AND GROWTH

GROUPS OF farm managers began forming farm management associations and societies as soon as our Agricultural Colleges and the U.S.D.A. recognized Farm Management as a distinct field. Dr. W. J. Spillman became head of the Office of Farm Management in the Bureau of Plant Industry, U.S.D.A., in 1904. At about the same time some of the Agricultural Colleges offered courses in Farm Management under the Departments of Animal Husbandry, Soils, Crops, and others. In June 1910, the Missouri College of Agriculture created the first Farm Management Department in an Agricultural College. Thus, from 1904, and for the next ten to fifteen years, the Farm Management idea was taking root and starting its growth.

In 1909-10, the Northwest Farm Managers Association was organized at Fargo, North Dakota. Mr. Charles R. Wright was one of the early organizers and leaders, and Cap Miller has been Secretary throughout its long and successful history.

The Missouri Farm Management Association was organized at Columbia, Missouri, in December 1910 with R. S. Harriman, President, D. Howard Doane, Secretary-Treasurer. It consisted of a group of farmers who thought of their main farm problem as that of Farm Management.

The Illinois Farm Managers Society and the Minnesota Farm Managers Association were organized in 1929. As far as we can determine these were the first groups that were clearly dominated by men who were managers of farms not owned by themselves, and who devoted practically 100 percent of their time to this work.

Since that time the Appraisal Institute of Canada has been organized and State Societies of Farm Managers and Rural Appraisers have been formed in Indiana, Iowa, Michigan, Oklahoma, and Ohio.

In 1919, professional Farm Management had its birth. This brought together two groups of men: the private farm manager who devoted his efforts to managing the farm or lands of a single farm owner, and the professional farm manager who offered his services, and that of his associates, to any number of clients. As these groups grew and met on various occasions, it soon became clear that they had many common objectives and problems. It was evident that an exchange of ideas among them would be mutually beneficial. To this end the American Society of Farm Managers was organized.

American Society of Farm Managers

A number of men who attended Farm and Home Week at the University of Illinois, and took part in and enjoyed the meetings of the Illinois Farm Managers Association, got together for the purpose of creating an organization with broader objectives and territory. It appeared that the time had come when they could unite the efforts of all farm managers and create a national organization. The first plan was to form a strictly limited, technical professional organization with well defined attainments and experience as a basis for membership. A survey of the situation showed that regardless of the worthiness of these objectives, the field of farm management was still so small that there was little hope for a successful organization on that basis. The decision was then made to do two things:

(a) Sponsor and aid in the development of State Farm Management Societies with very broad requirements for membership, and

(b) Create a National Society with a limited membership.

The minutes of the first meeting of the group interested in a National organization show that it was called on January 14, 1929. The minutes state:

> "After some discussion as to just what steps should be taken toward organization, it was decided by motion that a temporary organization should be drawn up, consisting of a president, vice-president, and secretary-treasurer, who, with Prof. R. R. Hudelson serving as an Advisory Committee, should make arrangements for a definite organization meeting at some date in the future.
>
> "The following men were elected for the temporary organization: President, D. H. Doane; Vice-President, F. E. Fuller; Secretary-Treasurer, Carle C. Walker; Advisory Member, R. R. Hudelson.

On May 27, 1929, a second meeting was held, and the report of the Organization Committee headed by Prof. Hudelson was accepted and approved.

On January 15, 1930, a Committee on Definitions and Ethics reported with Professor H. C. M. Case as Chairman. At that time officers were permanently elected and were as follows:

D. Howard Doane, President
N. C. Kennick, Vice-President
H. C. M. Case, Secretary-Treasurer

The report of the Chairman of the Committee on Definitions and Ethics shows clearly that the thought behind the organization was that it should be one composed of persons offering their services to the public in the management of land but would not bar men who were devoting their time to the management of single estates or even to the management of their own property in the event that it included relatively large acreages. The Secretary states, "Our membership, however, has not at any time extended outside of such a group and agricultural college men."

Rural Appraising

Since the beginning of the Society many members have been rural appraisers as well as farm managers. The thought that more definite recognition should be given to those so interested has long been held. During 1936 the Society, by action at its annual meeting, changed its name to the American Society of Farm Managers and Rural Appraisers and invited qualified rural appraisers to join the Society. A gratifying response has followed.

Accredited Members

During the same year another growing idea became a reality—the accrediting of qualified Farm Managers and Rural Appraisers.

This movement represents the fulfillment of a long cherished idea of the founders of our Society. Its realization brings into being a standard by which professional Farm Managers and Rural Appraisers may be judged. Men who have qualified themselves to take and pass the examinations have shown the public that they have a background of education, experience, and an appreciation of the necessary ethical precepts to be worthy of the public trust placed in them when employed within their fields.

A candidate for the title of Accredited Farm Manager (A.F.M.) or Accredited Rural Appraiser (A.R.A.) must have had:

(a) A university education or its equivalent

(b) Five years' practical experience in his respective field of farm management or rural appraising

(c) Furnish affidavits of satisfactory performance of duty

(d) Pass rigid written and oral examinations.

From the foregoing it would appear safe to say that men who have attained the Society's highest recognition and award may have said of them that:

They have shown the necessary qualifications to pass the educational tests of their respective colleges and universities,

They have had years of experience in the actual management or appraisal of farms,

They have shown by sworn affidavits that they have given satisfactory and honorable service to clients,

They have filed with the Examining Board satisfactory evidence that they can make clear, accurate and dependable management plans or appraisals,

They can under examination go to a farm and appraise it or make a management plan for it,

They can successfully pass a carefully prepared written examination,

They can successfully pass an oral examination given by the Board and assisted by the heads of departments from our leading Agricultural Colleges, and

They have signed and accepted in spirit and in fact the Code of Ethics.

It is the feeling of the officers of the Society that their bestowal of these titles marks an achievement and an obligation that tends to assure to the public well qualified, dependable, and ethical professional service in farm management and rural appraising.

Journal

At the January 1937 annual meeting, the Society authorized the publication of a semi-annual journal.

Conclusions

During these years the American Society of Farm Managers built its foundation of service with a widespread membership in the United States and Canada."

A Practical Definition

Continued from Page 581.2

5. Shall cooperate fully with the manager in his relationship with the tenant by not interfering with the operation, criticizing the tenant, or granting favors to the tenant without first discussing the matter with the manager.

6. Shall not ask manager to assume in any way risks which belong to him as owner of the farm against claims arising either by virtue of ownership of the farm or the operation of it.

7. Shall recognize the fact that results may on occasions prove disappointing due to bad weather, insects, prices and other conditions beyond human control and be willing to recognize that a good manager may have alleviated what might have been more disappointing results.

8. Extend to the manager the professional courtesy of expressing to the manager in confidence his frank criticism of any of the work performed by the manager or the tenant and/or operator and to refrain from expressing such criticism to anyone else until the manager has been given an opportunity to explain.

9. Recognize that in rehabilitating and restoring run-down and neglected farm properties the cost of management is often an investment for future benefits and values and cannot be accurately measured in terms of immediate income.

10. Make a thorough study and analysis of the program undertaken on the farm and by preserving reports received from the manager, maintain a record of the accomplishments made.

SAFETY RULES FOR FARMS

FARM OWNERS, MANAGERS, SUPERINTENDENTS, AND EMPLOYEES SHALL CAREFULLY GUARD AGAINST ACCIDENTS AT ALL TIMES BY OBSERVING SUCH SAFETY RULES AS THE FOLLOWING:

GENERAL

1. No person's employment shall become effective on a property until he reads or hears and subscribes to these rules.
2. Each employee shall report to the Foreman in charge, any thing or condition that appears to be dangerous, such as vicious bulls, badly worn equipment, imperfectly constructed improvements, open wells, etc.
3. The Foreman shall report to the owner immediately any hazards brought to his attention.
4. No person shall sacrifice safety for speed. Always take time to think.

TRACTORS

1. Tractors shall be operated only by those persons designated by the farm superintendent.
2. Tractors shall not be hitched to loads materially in excess of those for which they are rated.
3. No makeshift hitches that are dangerous in any way shall be used.
4. Tractors shall not be operated at a higher rate of speed than that recommended by the respective manufacturers.
5. No person shall ride on a tractor as a passenger when it is operated by another person.
6. No employee shall oil machinery or equipment while it is is operation.
7. When attaching equipment a second party shall not remain between the approaching tractor and the equipment to be attached: nor shall the tractor operator attempt to control the tractor from the ground.
8. No party shall operate the tractor-powered equipment unless the power take-off shaft is shielded nor remove shield while machinery is in motion.
9. No person shall smoke near a tractor when it is being refueled.
10. Tractors shall not be operated inside barns or other buildings where easily combustible materials are stored.
11. Tractors shall be turned carefully especially on uneven ground to prevent turning them over.

EQUIPMENT (Feed Grinder, Combine, Hay Press, Ensilage Cutter, Small tools, etc.)

1. Gloves shall not be worn when working near unshielded belts, gears, and shafts.
2. No employee shall wear a loose coat or wear shirt loose over trousers top when working near unshielded belts, gears, or shafts.
3. Belts shall not be jerked or kicked off machinery while it is running.
4. Goggles shall be worn by all persons when working at stone crushing plants, both when breaking and when crushing stone.
5. No person shall hop rides on any moving equipment. No person shall ride upon equipment that is not designed for carrying passengers.
6. No person shall walk in the path of moving equipment between the power unit and the equipment. (For example: Between a tractor and combine, etc.)
7. All mowers and similar equipment shall be thrown out of gear before stepping in front of the sickel bar.
8. All small tools such as rakes, pitch forks, axes, scythes, etc., shall be kept hanging in their place when not in use.
9. No axe, hatchet, or hammer with a loose head or any small tools with loose or broken handles shall be used.

LIVESTOCK

1. All persons working with cattle shall be on guard to avoid being struck with their horns. Bulls shall always be handled with a bull staff.
2. If any animal shows signs of a mean disposition all persons on the property shall be warned to be on guard against it.
3. No person without a reasonable amount of experience in handling horses or mules shall be left in charge of a team.
4. No child under the age of 14 shall be left alone with a team.

IMPROVEMENTS

1. All stairways shall be kept clean and free from all types of articles.
2. All steps shall be kept in good repair and holes in the floor shall be repaired immediately.
3. Broken or weak ladders shall not be used.
4. Gasoline or kerosene shall not be used to revive fires which appear to have gone out.
5. No person shall smoke inside the barns or other buildings which have Hay, Straw, or other feed stored in them.
6. Safety matches shall be used for all purposes. Matches shall not be carried loose in the pocket or lighted inside buildings.
7. Children shall not be permitted to play around the hay-hoisting ropes or pulleys when the barns are being filled.
8. Any employee who observes a feature that in his opinion is a fire hazard, shall report it immediately to the farm superintendent.
9. All wells, cisterns, and other cavities in the ground shall be kept securely closed.
10. All electric equipment, wiring, etc., shall be of approved materials, installed by experienced persons and checked regularly for knotted or bare wires which may short circuit.
11. No person shall seek shelter under a tree or near a fence during an electric storm.
12. Wire fences accessible to large numbers of people shall be grounded by placing a heavy wire on every sixth post. Wire should reach two feet into the ground and extend one foot above the top of the post.

POISONS AND EXPLOSIVES

1. All poisonous materials shall be kept in a fixed place, fully and conspicuously labeled, and out of reach of children. Proper antidotes shall be on hand at all times.
2. All explosives and firearms shall be kept in a fixed place out of the reach of children.
3. Explosives shall be used only by the farm superintendent or those designated by him.

FIRST AID

1. A first aid kit, including printed instructions for all types of first aid, will be maintained at the farm superintendent's residence or at the home of the principal employee.

POSTED______________________________

FARM_______________________________

MANAGER____________________________

591.1

HOME SAFETY AND FIRST AID

HOME SAFETY

United States home accidents' annual toll: 32,500 killed; 140,000 crippled; 4,600,000 injured.

More than one-third of all fatal accidents and nearly half of all injuries are sustained in and about the home.

1. **Floors and Stairways:** (Check √)
   - Are they kept clear?.................................... ....
   - Are they in good repair?.. ....
   - Are they well lighted?.................................. ....
   - Are they secure from slipping?........................ ....
   - Are loose rugs anchored?.............................. ....
2. **Porches and Balconies:**
   - Have they secure railings?............................. ....
   - Have they solid foundations?.......................... ....
   - Have they level floors?................................. ....
   - Is screening secure?.................................... ....
3. **Appliances and Equipment:**
   - Are gas burners properly adjusted?.................... ....
   - Are connections free from leakage?................... ....
   - Is electric wiring insulated?........................... ....
   - Are switches at safe locations?........................ ....
   - Are all appliances shockproof?......................... ....
4. **Sharp Tools and Instruments:**
   - Are they kept in safe places?.......................... ....
   - Are they used with due care?........................... ....
5. **Toys:**
   - Do toys have sharp points and edges?................ ....
   - Are toys put away after use?.......................... ....
6. **Fires:**
   - Has chimney been cleaned recently?.................. ....
   - Are pipes safely located—connected?................. ....
   - Is fireplace properly screened?........................ ....
   - Are matches kept from children?...................... ....
7. **Trash and Rubbish:**
   - Are they promptly disposed of?........................ ....
   - Are safe containers used?............................... ....
   - Is broken furniture discarded?......................... ....
8. **Firearms:**
   - Are firearms kept unloaded?........................... ....
   - Are they out of reach of children?.................... ....
9. **Foods:**
   - Are foods protected from flies and dust?..............
   - Are perishable foods kept cool?........................
   - Are hot containers safely placed........................
10. **Poisons:**
    - Are poisons safely stored?.............................
    - Are containers clearly labeled?........................
11. **Garage:**
    - Are garage doors kept open while motor is running?...
12. **Yard:**
    - Is it a safe place for children to play?................

An inspection of your house and yard on the basis of the foregoing may easily result in eliminating many home hazards.

SUGGESTIONS—When accidents occur

Do not allow the hands or clothing to touch a wound. Do not use strong antiseptics. Use boiled or sterilized water only. Never suck a wound, however small. Squeeze to make it bleed freely, then bandage with sterlize gauze. If the wound is deep, like a bullet hole or a knife thrust, call a doctor, using a tourniquet if necessary, until he comes. A tourniquet is simply a strong cord tied around the limb between the wound and the heart, and tightened by inserting a stick and twisting. There is less danger from the bleeding of a mangled wound, but more danger of infection in the deep wound, as the instrument that caused it may carry germs deep into the flesh.

For an ordinary bruise, use cold-water applications. If the skin turns black and blue, use hot water three times a day and bathe with rubbing alcohol.

In case of fractures, sprains or dislocations, bind the injured part, to prevent motion, and call a doctor. Loosen the bandage if swelling increases. For sprains only use hot and cold applications.

For internal poisoning induce vomiting and call the doctor. Learn what poison has been taken and supply the antidote.

Kansas Safety Council

ANTIDOTES

After the stomach is thoroughly washed out, give the proper antidote if you know what it is and if it is on hand. An antidote is a remedy which counteracts the effect of the poison. If the poison taken cannot be determined, whites of eggs or milk may be administered.

For Carbolic Acid (phenol): Vinegar, soapsuds, or raw whites of eggs in water.

For Bichloride of Mercury (corrosive sublimate): Raw whites of eggs. Or give alum water, or mustard water, or salt water.

Poisoning with bichloride of mercury is almost impossible to cure unless the patient is given white of egg immediately.

For Strychnine: Potassium permanganate (in the proportion of one-fourth teaspoonful in one quart of warm water). Keep the patient quiet.

For Rat Poison and Fly Poison (usually, contain arsenic): Hydrated oxide of iron and magnesia, or mustard water, or salt water or raw whites of eggs beaten up in milk.

For Matches: Magnesia, or mustard water or salt water, or raw whites of eggs. Give no oils.

For Iodine: Starch in water, or bread and water.

For Sleep-inducing Drugs (codeine, morphine, opium, etc.): Permanganate of potassium (one-third teaspoon to one pint of water), or repeated drinks of strong tea or black coffee. Keep the patient awake.

For Corrosive Poisons: Corrosive poisons, among which are strong acids and caustic alkalies, destroy the tissue. When a corrosive poison has been taken, the lips and tongue are stained or burned, and it is usually unwise to force vomiting. Give drinks of milk, milk and eggs beaten up together, or flour and water. If the proper antidote is at hand, it may be given first. Examples of corrosive poisons and their antidotes follow:

For Acids (hydrochloric, nitric, sulphuric, etc.): Magnesia in warm water, or baking soda in water, or lime (scrape plaster from walls, if necessary) in water. A solution of soap is a good, and usually an available antidote for corrosive acids.

For Caustic Alkalies (lye, soda, potash): Olive oil; follow with diluted vinegar or lemon juice.

Snake Bites—Prompt action is necessary in case of poisonous snake bite. Have patient lie down and remain quiet. Apply ligaature above wound to keep poison from spreading. A handkerchief, a piece of cloth, or a necktie may be used.

With the tip of a knife or razor blade that has been passed through the flame of a match, cut into the wound to insure bleeding and to let the poison out. Make a crosscut in the shape of the letter "X," from ⅛-inch to ¼-inch in depth over each fang mark, preferably connecting the punctures. Then apply suction.

NOTE: The bite of a poisonous snake is rapidly followed by severe pain and, within 10 minutes, by swelling. Always see a physician as soon as possible, but in the meantime give first-aid treatment.

HOME MEDICINE CHEST

Tannic acid jelly—for burns.

Aromatic spirits of ammonia—for faintness (in small quantities and well stoppered).

Baking soda—emetic or indigestion.

Mild laxative.

Bandages, sterile gauze and adhesive tape (protected from dust).

Clinical thermometer.

Scissors.

Tweezers.

Simple remedies as peroxide of hydrogen, iodine, or some other good antiseptic, zinc oxide, vaseline, medicated alcohol and antiseptic dressings.

The chief causes of preventable accidents

Carelessness and thoughtlessness.

Farm accidents: principal causes

1st, Machinery, or 38 percent of all.
2d, Livestock, or 26.5 percent of all.
3d, Falls, or 15 percent of all.
4th, Wood-cutting, or 7 percent of all.
Other causes, 13.5 percent of all.

DOANE AGRICULTURAL DIGEST 1942

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12. Mo.

American Farmway Life Program

The ideal position or ultimate goal of a farmer should be a well balanced program including such features as the following. The order of achieving them is somewhat indicated by the order of listing.

1. *MACHINERY, EQUIPMENT and POWER that is efficient.*
2. *LIVESTOCK and POULTRY that is efficient and productive. The* NUMBER, KIND *and* QUALITY *should be that which makes possible the most effective operation of the farm.*
3. *LIFE INSURANCE for added family protection. This should be started not later than marriage or with the arrival of the first children.*
4. *CASH sufficient to carry the normal year-round operating expenses. Peak seasonal cash requirements can be borrowed as needed.*
5. *BONDS selected for maximum security and/or well secured first MORTGAGES ON FARMS.*
6. *FARM OWNERSHIP. The purchase of the farm may exhaust temporarily the investments listed as "Fifth," and in addition may involve a mortgage.*
7. *NO DEBTS.*
8. *INVESTMENTS can take many forms* AFTER *all of the foregoing have been accomplished. However, farmers should normally keep their funds close to the soil rather than in new and unfamiliar fields such as oil stocks. Old age annuities are recommended as they spread risks and help balance the investments on which to retire. Additional income land can be purchased to be rented out or loans can be made on farm mortgages, or government bonds can be bought.*
9. *EDUCATIONAL, CULTURAL, RELIGIOUS VALUES, and provisions for the comforts of the family should start at the beginning and increase as the program expands. Anyone can have good reading, study with the agricultural extension service, obtain free college bulletins, and be active in the local church. An important part of the pay that comes from farming is the wholesome surrounding in which to work, outdoor life, and the advantages of raising a family in the country. The aesthetic values and comforts and conveniences of the home should never be neglected.*
10. *The AMERICAN FARMWAY LIFE PROGRAM combines the farm business and the home. It is a "Cradle to the Grave" system* THAT THE INDIVIDUAL CAN WORK OUT FOR HIMSELF. *The farmer does not have the benefit of the government old age security plan. The American Farmer asks only that a democratic form of government be continued under which* INDIVIDUAL INITIATIVE, ABILITY, *and* THRIFT *can have* FREE EXPRESSION.

EVERY FARMER SHOULD PLAN HIS LIFE PROGRAM AND CONSTANTLY KEEP HIS GOAL EVER IN MIND. HE SHOULD NOT PERMIT WARS, INFLATION, AND SPECULATION TO DIVERT HIM — OR WRECK HIS LIFETIME PROGRAM.

DOANE AGRICULTURAL DIGEST 1944
This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U. S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

INVESTMENTS BY FARMERS

1. APPRAISE THE INVESTMENT

The investor should be sufficiently well informed about the history and future earning possibilities of an investment to enable him to make a fairly accurate appraisal based on the capitalized net income.

2. BE WARY OF THE CHANGING PRICE LEVEL

(a) When the general price level rises, farm prices rise more rapidly than farm costs and the resulting net income gives farmers funds to invest.

(b) When the general price level falls, farm prices fall more rapidly than farm costs.

(c) Farmers can protect their financial security during a deflationary period by: (1) Investing conservatively when prices are high—that is investing in those things which are least affected by price fluctuations. These include modern home conveniences, education, art, music, as well as most farm business investments and War Bonds. (2) Staying out of debt. (3) Keeping inventories of high-priced livestock and cash crops at a minimum to avoid being "caught" when prices fall.

3. INVESTMENTS WITHIN THE FARM BUSINESS

(a) Farm land is generally a wise investment because it tends to undergo less fluctuation in value during periods of rising and falling prices. Purchasers should be cautious of buying land at speculative prices such as one is liable to find near large industrial centers. It is not wise to go into debt for farm land at present increased prices unless the debt can either be retired in a short time or the purchaser has assurance that the debt payments will be decreased as farm prices and farmers' net incomes decrease.

(b) Farm improvement investments are wise investments provided the improvements are needed and can be made either from current income during an inflationary period or provided they can be made during a period of declining prices from past saving. During periods of low prices it is often wise to make improvements from either past savings or on credit.

(c) Machinery is a wise investment of current income because it will make possible greater food production with less labor. A farmer should remember that some pieces of high-priced machinery may not be economical after the war because more labor will be available at that time. The warning should be "don't buy it if you don't need it now".

(d) Livestock investments on farms have been wisely increased, owing to favorable relationships between the price of feed and the price of livestock and livestock products. It will be wise to attempt to reduce these inventories before the post-war decline in prices occurs.

(e) Purebred livestock raising is a specialty and farmers investing in this line should not expect large returns unless they understand the business. Purebred breeding stock is generally a better investment during a period of low prices than during a period of high prices.

(f) Other investments within the farm business. During a period of rising prices it is wise to be rather liberal in the use of fertilizer, good seed and disease control measures.

(g) Pay farm debts now. Stay out of debt now and after the war.

4. INVESTMENTS OUTSIDE THE FARM BUSINESS

(a) Not all farmers are concerned with the problem of making outside investments because of the length of time they have been farming, their relative success as farmers and whether they bought their farm or inherited it.

(b) In general, farmers believe that outside investments should be in something in which they either have a voice in the management or the firm or company should have established good reputation.

(c) Farmers believe that it is wise to invest in War Bonds, farm mortgages, life insurance, local urban real estate, building and loan shares, bank stock, established local industry and farmers cooperative buying, selling and processing organizations.

(d) Watch out for "wildcat" investment schemes when the war is over. Remember that most sound investments are handled by banks, insurance companies and other established investment organizations.

5. INVESTIGATE BEFORE YOU INVEST

Banks, . . . Better Business Bureaus, Chambers of Commerce and established business men are often able to give helpful advice on investments. 1/

Factors which influence use of farm family net income. Four factors which exert a great deal of influence on the use of a farm family's net income are the following:

(1) *The goals of the family,* their wants and desires, both long-time and short-time, are definite controls on the family purse. For example, one farm family's goals are the payment of the mortgage on the farm, a college education for the three children, remodeling the kitchen, purchase of new electric equipment, and a vacation trip to California. The family with such definite goals has a better opportunity to guide the use of income than a family without goals.

(2) *The place of the family in its life cycle* will influence the timing of these wants in life. The money for college education generally has to be available when the children are about eighteen years of age. The time for paying off the mortgage on the farm should not come during the years when it will compete too strongly with other family needs. We find from our family economics research[2] that during the first five years of married life, the average health expenditures of the account-keeping families are particularly high due primarily to the arrival of the babies in the family. The peak load on the family pocketbook generally comes during the twenty to twenty-five years married period for that is the time when nearly all the furniture and home equipment purchased during bride-and-groom days must be replaced. Also the older children's needs for high school and college drain the family purse during this period. The food, clothing, and transportation costs are at the peak, for the family has reached its maximum number.

Thus the number of years married or place in the life cycle has a decided influence on the use of income.

(3) *The irregularity of the farm income* from year to year has a tendency to limit fixed yearly uses of income. Farm families are naturally afraid of high fixed monthly electric service costs and high fixed principal and interest payment charges due every year because of the wide swings in income.

The irregularity of the income received during the year curtails regular monthly living expenditures generally to the level of the egg-and-cream money. But the advantage of receiving the major part of the income in one or two checks, such as corn and soybean checks on a grain farm, has a tendency to increase savings.

(4) *The amount of living obtained direct from the farm* in the form of food, fuel, and the use value of the farm dwelling, supplements the net money income and makes possible a higher level of living than the net money income would indicate. 2/

Although it may be safely assumed that large amounts will be put into this wholehearted support of the war effort, the present period offers one of the best opportunities this generation has seen for reducing farm indebtedness and getting into a strong position to meet the difficult times that may be ahead. 3/

A 1916 Prediction:

"I do not know of any class in America who are likely to be more powerfully affected in their business relations by the economic situation of the United States at the close of the European War than the farmers.

"The prices of agricultural products are soaring skyward. A period of rising prices almost invariably creates a speculative spirit. This speculative spirit grows by what it feeds on, and sometimes goes beyond the bounds of reason. In that case disaster is certain to come to somebody. The lucky ones who get out from under in time will make money; the others will become bankrupt.

* * *

"The best and soundest advice which I could give American farmers, therefore, is to be cautious. If you know exactly how long the war will last you can safely speculate. If you do not, you had better go slow. At all events, whatever you do, don't be in debt when the war closes, for if you are heavily in debt at that time I can predict your bankruptcy with about as much feeling of certainty as I can predict that the sun will continue to shine or the moon to wax and wane."

(Source: Thomas Nixon Carver. Professor of Political Economy, Harvard University. *In:* the University of California Journal of Agriculture. December, 1916.) 3/

1/ MICHIGAN SPECIAL BULLETIN 322; 2/ *Illinois Farm Economics*, April, 1944;

3/ CALIFORNIA AGRICULTURAL EXTENSION SERVICE, CIR. 126

LIFE INSURANCE FOR FARMERS

The basic theory of life insurance is that the bread winner of the family may die unexpectedly and that some means must be provided for caring for the dependent wife and children.

"The farmer's life insurance problem differs from that of many wage earners and salary workers in that he is operating a business of his own in which there is ample opportunity to invest practically all of his savings. It takes most farmers nearly a lifetime to get a good farm fully stocked and equipped and free of debt. If this is accomplished, the accumulated property provides security for old age. In the meantime, life insurance protection is usually needed but not life insurance investments."

HOW MUCH INSURANCE?

FIRST, decide on the amount necessary to cover outstanding indebtedness and add to this the amount of insurance that is needed to provide a minimum level of income for your wife and children if you should die.

SECOND, determine the amount of money that will be available for insurance and make this go as far as possible in providing the protection which your family should have.

THIRD, if you have funds available beyond this minimum, it will then become a matter of business judgment as to whether you buy other types of insurance with more investment features or take the surplus funds and invest them in the farm or some other type of security.

KINDS OF LIFE INSURANCE

"The year-to-year cost of insurance protection--which means the payment of the policies belonging to those who die--is the same regardless of the type of policy ....Most of the differences in policy premiums are due to variations in the amount of investment."

TERM INSURANCE POLICIES give the maximum amount of temporary protection at the lowest possible cost. Term insurance is more economical at the younger ages when greatest protection is needed. It is not available in old age.

LIFE POLICIES (Ordinary & Limited Pay) give the greatest amount of permanent protection at the lowest annual cost. Life policies fall into two groups:

Ordinary Life - On these the policy holder agrees to pay to the insuring company a given premium each year as long as he lives.

Limited Life Payments - On these the policy holder agrees to pay a given annual premium for a given number of years or until he reaches a pre-determined age.

ENDOWMENT POLICIES - These policies differ from the other types in that if the policy holder survives he can collect the insurance. They are a form of saving. "For farmers, it is usually the least satisfactory type, since the emphasis is more on investment and less on protection."

SELECTING THE COMPANY

FIRST, make sure the company is approved by the "Best's Life Insurance

AMOUNT OF INSURANCE THAT $100 PER YEAR WILL BUY

Type of Policy	**PROTECTION**--Face Value of Policy that $100 will Buy			**INVESTMENT**--Cash Value of Same Policies at end of 20 years		
	Contract Age			Attained Age		
	25	35	45	45	55	65
5 year term	$11,778	$10,741	$7,294	None	None	None
10-year term	11,655	9,990	6,317	None	None	None
10-year term rider	17,857	13,624	8,811	None	None	None
20-year term rider	16,750	10,753	5,350	None	None	None
Ordinary Life	6,061	4,444	3,032	$1715.26	$1608.73	$1367.43
Paid up at 65	5,353	3,834	2,344	1690.25	1763.64	1767.38
Endowment at 65	4,596	3,226	1,953	1797.04	1854.95	1953.00
20-pay life	3,596	2,966	2,344	1981.40	1939.76	1767.38
20-year Endowment	2,124	2,096	1,953	2124.00	2096.00	1953.00
$100 per year invested at 2% compound interest.	None	None	None	$2478.33	$2478.33	$2478.33

Based on Non-participating Rates as of August 1946.

LIFE INSURANCE FOR FARMERS

Reports." Any good insurance man will have a copy of these reports and if Best's says that a company is good, you can be quite certain that it is sound as of the date of the report.

SECOND, other things being equal, select a company licensed under the New York laws. Past records have proved that any company so licensed is safe.

THIRD, further information concerning a particular company can be obtained from your state insurance departments located at the state capitol.

SELECTING THE AGENT

Be sure that you are working with an honest agent who is interested in serving your needs. If you have any reason to suspect that you are not being properly informed of all conditions and specifications of the insurance policy under consideration, consult your banker or an attorney. Do not let a man that you do not trust write your life insurance.

INSURANCE INVESTMENTS

The permanent types of life insurance are a method of systematic saving. However, if you could safely invest $100 per year at 2 per cent compound interest, your saving at the end of 20 years would be greater than if you had invested a comparable amount in insurance.

This difference represents the cost of protection which the insurance company provides during the 20-year period. With insurance your family would be guaranteed an amount of money equal to the face value of the insurance carried, if you should die during the period; whereas, with other investments they would have only the amount invested plus annual accumulations.

INCOME TAXES

The income from an insurance estate is not subject to income taxes. Thus, you can leave your wife $100 a month in life insurance income and be sure it will not be taken for taxes. The income from all other types of securities such as real estate, stocks and bonds is taxable.

TAKING PAYMENT

When a person passes away, his death creates definite expenses. So a portion of your insurance should be left in cash as a "Clean-up Fund."

With the remaining portion give serious consideration to arranging for a regular income to go to your wife for life, or until the children are through school. Payments should be arranged to suit the needs of the individual family. The insured can make these arrangements before his death or his wife can request them after his death.

ANNUITIES FOR FARMERS

Annuities are one way of investing savings. They are not insurance, although sold by insurance companies and frequently combined with insurance. One never gets too old or too crippled or too sick to buy an annuity.

An annuity contract provides for the payment of a specified sum to the annuitant (purchaser) beginning at a specified age and continuing as long as he lives. It is the only type of contract or investment program that guarantees a set monthly income to the person concerned for the rest of his life.

INCOME TAXES

Taxes on annuities are favorable. They are assessed at 3 per cent of the purchase price until the total income reported is equal to the original cost of the annuity. After that, all income from an annuity contract is subject to tax as earned income. The total annual tax on annuity income is only about half as much as for income from dividends, interest and rent.

KINDS OF ANNUITY

SINGLE PREMIUM IMMEDIATE ANNUITY -Under this type of contract the purchaser begins receiving payments immediately after purchasing the contract. Immediate annuities are of two kinds:

Life Annuities - This plan provides for paying an agreed sum of money to the annuitant at regular intervals as long as he lives.

Refund Annuities - This plan provides that any balance of the original cost not paid to the annuitant during his lifetime will be returned to his beneficiary or his estate upon his death.

ANNUAL PREMIUM DEFERRED ANNUITIES -Under this type of contract the annuitant invests an annual premium and can take the income at any time he chooses between the ages of 50 to 70 years.

Annuities are very often desirable for farmers who are ready to retire and who wish to invest the proceeds from the sale of the farm or other savings in such a way as to have a steady and sure income for their remaining years.

Quotations are from Cornell Ext.Bull. 459, Cornell University, Ithaca, New York.

The book "Farm Management and Marketing" by Hart, Bond, and Cunningham published by John Wiley & Sons Inc., New York, is also a good reference. Both are recommended for further study.

BEFORE YOU BUY A FARM

A SOUND APPROACH FOR THOSE WHO WANT TO BECOME FARMERS

Those who are considering farming should adopt an approach which minimizes the chances for failure.

Buying a farm is, for many, the most important financial step in their lives. It involves much more than the money invested. It involves such things as success or failure, happiness or unhappiness, the health and education of children and security or insecurity in old age.

Failure does not necessarily mean bankruptcy. This is illustrated by the rural slums, illiterate, undernourished and meager existence of thousands of farm families in this rich and prosperous nation.

Fully one-fourth of those now on farms are misfits and are not making a success even though they continue to live in the country. They are merely subsisting from year to year.

Here are a few of many major considerations for a sound approach to farming.

1. Go slow when buying a farm. Remember,
   (a) There will always be lots of farms for sale -- and
   (b) Farms are usually lifetime investments. Mistakes in buying may be costly for every year of ownership.
2. Keep your name off notes and mortgages until you KNOW,
   (a) Your farming ability, and feel certain about the
   (b) Future prices of farm products.

   Be fully satisfied that the risk is small enough so that you can afford to pledge your name and the future of yourself and family to the payment of the debt if called on to do so.
3. Study the future price outlook of farm products. This nation has ridden the crest of war-born inflation and struggled through the depth of drouth and depression. It is usually a poor time to buy when prices are at peak levels or when the trend is sharply downward.
4. Determine if you are personally adapted to farm WORK. Yes, work should be spelled in capital letters and underscored. Successful farming requires hard, physical labor.

   If you do not KNOW how well you are adapted to farm work, get a job as a farm hand on the type of farm you think you want to eventually own and operate. Work at least one year around the calendar -- including winter and summer. Farming has less appeal to some when it is 10 degrees below zero or 110 degrees in the shade, than in the balmy days of the spring and fall.
5. Find out whether your wife enjoys farm life. Farming is a partnership combining the home and the business. If your wife is not enthusiastic about farm life, be slow to impose it upon her. It is not fair to her and it will limit your success.
6. Get actual farming experience. "Few persons would consider operating a bank or a clothing store without some practical experience in those businesses. Many inexperienced persons believe, however, that practical experience is not essential for success in farming. No amount of knowledge gained from books or bulletins will take the place of practical experience in any business. . . A recommended way to get the needed experience is to work for successful farmers." (Cornell University)
7. Study agriculture. Success in farming requires technical knowledge and skill. Either study at an agricultural college or become a diligent student of practical agricultural bulletins and books.
8. Keep your money safely in government bonds while you check yourself fully on all of the foregoing. If still convinced

(continued on back)

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*This page replaces page 597-598 "Servicemen and City Workers".

BEFORE YOU BUY A FARM

(Continued from front)

that you want to farm and that you have a good working knowledge of agriculture, you are ready to decide on the farm.

9. Make up your mind as to the size and type of business that is to be your long-time objective. There are three major possibilities:

   (a) Small farms - Home and subsistence units. In 1940, 59 per cent of all farms averaged 100 acres or less and 47 per cent produced less than $600 of farm products that year.
   (b) Medium size - Home and commercial farms. This group makes up roughly 30 per cent of all farms.

   (c) Commercial farms, Ranches and Plantations - Few come into this classification. In 1940, only 12 per cent of all farms were over 260 acres in size. Only 11 per cent sold more than $2500.00 worth of farm products.

Do not start out under the misconception that with $2,000 to $5,000 plus a loan you can safely handle, that you can become a farm owner on the scale of a good commercial farmer. You will be fortunate to have a small home or a subsistence farm. You will not have a large yearly income.

SIZE OF BUSINESS

SMALL FARMS-- The size of a farm business often is small even though the acreage is large. It is the size of income that counts.

Those who become farm owners with a small amount of capital tie themselves and their families to a small farm business. If you start that way, be prepared to be satisfied with a modest home and a low cash income. Only by being extremely frugal and denying yourself and family conveniences and luxuries can you accumulate enough money on such a farm to move very far up the agricultural ladder. Thousands make the mistake of using their savings to buy subsistence or abandoned farms. A cheap home and a meager living is the most that they can expect.

PART-TIME FARMS fall in the small-farm group but deserve special consideration. They often have real merit.

If you buy a farm with limited capital, you will probably be wise to get a small productive acreage close to some city or industrial center. You or members of your family can then work part or full-time off the farm. Farm life and city incomes can thus be combined in a practical way.

In 1939, about 29 per cent of all farmers in the United States worked part-time off their farms. They received pay for an average of 137 days labor. Study fully the merits of part-time farms.

MEDIUM-SIZE FARMS-Within this group falls the traditional family-size farm where the home and business is effectively combined. There is sufficient size of business and profits to support a comfortable home and to maintain a reasonable standard of living.

There is, however, a gross misconception about the capital required to own and effectively operate such a farm. Studies of thousands of farm management records in New York State show that, prior to the war, the average investment was about $11,000. In many areas the present cost of getting started into farming runs two to three times as high as before the war.

COMMERCIAL FARMS, RANCHES & PLANTATIONS These lie beyond the immediate reach of farmers with limited capital. They should be purchased strictly on a business basis after careful study.

The AMERICAN FARMWAY LIFE PROGRAM shows the way to become the owner of this kind of farm. (See Page 595)

(a) Start as a farm laborer if short of capital.

(b) Next, buy efficient machinery, equipment and power, and rent a farm in the community where you ultimately hope to buy.

(c) Farm ownership, as Step Number 6, is well down the list.

It is the way to start with no money or a small amount of capital and become a successful farmer. Use the American Farmway Life Program as your guide.

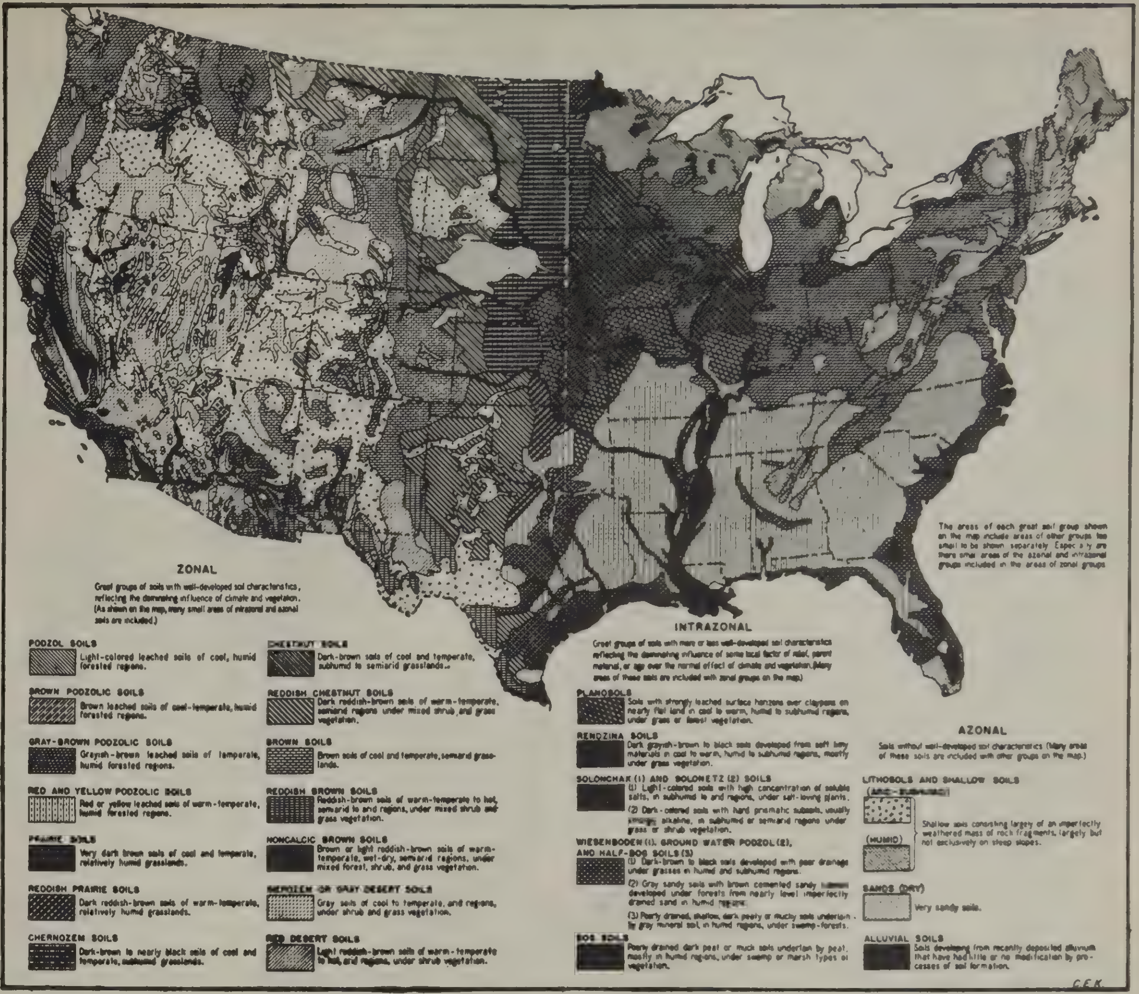
Farm ownership is a worthy ambition. Successful farmers are among the most independent and capable citizens. To reach such a goal, you should follow a sound program. It will bring prosperity and security for old age and permit you to enjoy, along the way, those educational and cultural values that distinguish the best of American farm families.

600 Soils and Geology

600 Soils and Geology

GREAT SOIL GROUPS

—General pattern of great soil groups of the United States.


The areas of each great soil group shown on the map include areas of other groups too small to be shown separately. Especially are there small areas of the azonal and intrazonal groups included in the areas of zonal groups
ZONAL
Great groups of soils with well-developed soil characteristics, reflecting the dominating influence of climate and vegetation. (As shown on the map, many small areas of intrazonal and azonal soils are included.)
PODZOL SOILS
Light-colored leached soils of cool, humid forested regions.
BROWN PODZOLIC SOILS
Brown leached soils of cool-temperate, humid forested regions.
GRAY-BROWN PODZOLIC SOILS
Grayish-brown leached soils of temperate, humid forested regions.
RED AND YELLOW PODZOLIC SOILS
Red or yellow leached soils of warm-temperate, humid forested regions.
PRAIRIE SOILS
Very dark brown soils of cool and temperate, relatively humid grasslands.
REDDISH PRAIRIE SOILS
Dark reddish-brown soils of warm-temperate, relatively humid grasslands.
CHERNOZEM SOILS
Dark-brown to nearly black soils of cool and temperate, subhumid grasslands.
CHESTNUT SOILS
Dark-brown soils of cool and temperate, subhumid to semiarid grasslands.
REDDISH CHESTNUT SOILS
Dark reddish-brown soils of warm-temperate, semiarid regions under mixed shrub and grass vegetation.
BROWN SOILS
Brown soils of cool and temperate, semiarid grasslands.
REDDISH BROWN SOILS
Reddish-brown soils of warm-temperate to hot, semiarid to arid regions, under mixed shrub and grass vegetation.
NONCALCIC BROWN SOILS
Brown or light reddish-brown soils of warm-temperate, wet-dry, semiarid regions, under mixed forest, shrub, and grass vegetation.
SIEROZEM OR GRAY DESERT SOILS
Gray soils of cool to temperate, arid regions, under shrub and grass vegetation.
RED DESERT SOILS
Light reddish-brown soils of warm-temperate to hot, arid regions, under shrub vegetation.
INTRAZONAL
Great groups of soils with more or less well-developed soil characteristics reflecting the dominating influence of some local factor of relief, parent material, or age over the normal effect of climate and vegetation. (Many areas of these soils are included with zonal groups on the map.)
PLANOSOLS
Soils with strongly leached surface horizons over claypans on nearly flat land in cool to warm, humid to subhumid regions, under grass or forest vegetation.
RENDZINA SOILS
Dark grayish-brown to black soils developed from soft limy materials in cool to warm, humid to subhumid regions, mostly under grass vegetation.
SOLONCHAK (1) AND SOLONETZ (2) SOILS
(1) Light-colored soils with high concentration of soluble salts, in subhumid to arid regions, under salt-loving plants.
(2) Dark-colored soils with hard prismatic subsoils, usually strongly alkaline, in subhumid or semiarid regions under grass or shrub vegetation.
WIESENBODEN (1), GROUND WATER PODZOL (2), AND HALF-BOG SOILS (3)
(1) Dark-brown to black soils developed with poor drainage under grasses in humid and subhumid regions.
(2) Gray sandy soils with brown cemented sandy subsoils developed under forests from nearly level imperfectly drained sand in humid regions.
(3) Poorly drained, shallow, dark peaty or mucky soils underlain by gray mineral soil, in humid regions, under swamp-forests.
BOG SOILS
Poorly drained dark peat or muck soils underlain by peat, mostly in humid regions, under swamp or marsh types of vegetation.
AZONAL
Soils without well-developed soil characteristics (Many areas of these soils are included with other groups on the map.)
LITHOSOLS AND SHALLOW SOILS
(ARID-SUBHUMID)
(HUMID)
Shallow soils consisting largely of an imperfectly weathered mass of rock fragments, largely but not exclusively on steep slopes.
SANDS (DRY)
Very sandy soils.
ALLUVIAL SOILS
Soils developing from recently deposited alluvium that have had little or no modification by processes of soil formation.
C.E.K.

FORMATION OF THE PRINCIPAL TYPES OF SOILS

Climate and vegetation as they impinge upon the parent rock may be regarded as the active forces in soil formation. They are conditioned by slope and act over a period of time. The chief components of climate—rainfall, temperature, and humidity—influence the amounts of various chemical elements and compounds in the soil. In humid regions where there is a large excess of rainfall over evaporation, leaching takes place, and the more soluble constituents are lost from the soil. In subhumid climates, as in the eastern Dakotas, there may be sufficient leaching to remove from well-drained soils the more soluble compounds, such as sodium chloride (common salt) but not enough to remove completely the less soluble salts such as calcium carbonate (lime), and these may accumulate just beneath the true soil to form a "lime zone," or carbonate horizon

In semiarid and desert regions there is little leaching. In the subhumid and drier climatic regions the soluble salts leached from the upland soils often accumulate in the low places and produce salty or saline soils. Such a concentration of salts in low-lying soils frequently follows irrigation and plagues the farmer. In poorly drained places, peat or Bog soils develop in humid regions, while accumulations of salts and saline soils are found in the arid regions.

In order to illustrate the different types of soil formation associated with different climatic and vegetative conditions, the formation of a few of the important groups of soils will be explained briefly. These great groups of soils may be placed in three classes in accordance with their geographic characteristics:

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(1) The zonal soils. These have well-developed soil characteristics that reflect the influence of climate and living matter. These soils are found on the undulating or gently sloping uplands with good drainage and are developed from any parent materials not of extreme texture (that is, neither very loose sands nor very heavy clays) or of extremely unbalanced chemical composition. Sometimes they are referred to as the "continental soils," since they are the dominant soils over large areas in many parts of the world.

(2) The intrazonal soils. These have more or less well developed soil characteristics that reflect the dominating influence of some local factor of relief or parent material over the normal effects of the climate and vegetation. Usually such soils are found intermingled in small areas with those of two or more zonal groups, although such a condition as poor drainage may prevail over a wide area.

(3) The azonal soils. These are without well-developed soil characteristics, owing to their extreme youth or to conditions of parent material or slope that prevent normal soil formation. Such soils are found on steep rocky slopes, on fresh alluvial deposits, and on formations of loose, nearly pure sand.

ZONAL SOILS

Of the zonal groups, the Podzol, Chernozem, Laterite, and Desert soils illustrate the main types of soil formation, and other zonal groups are more or less intermediate in their characteristics.

The Podzol soils are developed in a cool, moist climate under coniferous or mixed coniferous and hardwood forests, as in the northern Lake States, northern New England, and some of the high mountains. They are also found in northern Europe and Asia. In the evergreen forest the ground is well-shaded, and the trees are shallow-rooted. The needles are highly resinous and decompose slowly. There is a minimum of small flowering plants. The forest trees, especially the pines and spruces, feed relatively lightly on bases and return less of these to the surface to counteract the leaching influence of the rainfall than do the grasses: under the forest the soil becomes acid, and decomposition of the organic matter is

(Continued on other side.)

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GREAT SOIL GROUPS

(Continued from other side.)

accomplished more by fungi and less by bacteria than in grassland areas. The relatively soluble products of this decomposition are leached down in the soil and rapidly reduced to water and carbon dioxide. There is only a little humus as compared with the abundant amount in the soils of the grasslands. The surface layers become gray and are strongly leached of both organic matter and plant nutrients, while in the subsoil some of the clay and other relatively insoluble materials accumulate

This process is called podzolization, and with modifications it is important in the development of all zonal soils of the humid regions. Under the hardwood forests farther south, bases are returned to the soil more rapidly by the vegetation—both the trees and the associated plants—and more humus is formed.

The Laterite soils are less well understood, and there are many varieties. They are developed in humid or wet hot climates, under the tropical rain forest. Here weathering and all chemical and biological processes are intense. The nutrients circulate very rapidly from soil to plant and back to the soil again. Two principal processes may be involved. One is laterization, perhaps more strictly a process of weathering than of soil formation. The bases and silica are leached out of the original rock material, leaving it very rich in aluminum and iron. The material is usually red in color and very pervious to water. Under conditions of restricted drainage, streaked and mottled material develops which hardens upon exposure to the air. In India and elsewhere bricks and building stones, even statues, have been made of it. The name "laterite" was originally given to this material, but it is now applied more generally to a broad group of red tropical soils, and the soils with crusts or hardened material are called Ground-Water Laterites. After this process of intense weathering has gone on until the soil becomes acid and low in bases, podzolization, with the formation of leached layers underlain by horizons of accumulated clay, may go forward. In between the regions occupied by Laterite and Podzol soils are other soils, such as the Red Podzolic soils of the southern United States, influenced by both processes.

The Chernozem soils are developed in temperate subhumid regions under tall-grass vegetation. The grasses are heavy feeders on bases and return them to the surface fast enough to prevent the soil from becoming acid under the comparatively low rainfall. Large amounts of humus accumulate, and the soils are nearly black in color for 1 to 3 feet in depth. Since there is little movement of insoluble material, except as surface soil material falls into cracks, there is little difference in clay content between the different layers of the soil profile, whereas in podzolized soils the surface layers have less clay than the subsoils. In the Chernozem the soil particles are grouped into granular or crumblike aggregates and provide an excellent structure for crop plants. There is sufficient leaching to remove the most soluble salts but not enough to remove the calcium and magnesium carbonates completely. These accumulate in the lower part of the true soil, or just beneath it, in what is called a lime zone or carbonate horizon. Beneath this horizon there is frequently a layer of accumulation of the slightly more soluble calcium sulfate or gypsum. All of the zonal soils of the semiarid and arid regions have such a layer of carbonate accumulation. One of the most significant differences between the Chernozem soils of eastern North Dakota, South Dakota, and Nebraska and the Prairie soils of Iowa and Illinois is that the Prairie soils have no horizon of accumulated carbonates.

The Desert soils are developed in arid regions under a scanty vegetation. They are light-colored and are unleached except in the uppermost part. Because of the scanty vegetation and extremely variable precipitation, run-off and erosion are great. In humid regions, where there is a protective cover of vegetation, hills are rounded and slopes are curved, whereas the desert landscape is characterized by sharp angles and an abundance of erosion features. Large areas are swept by the wind, and the finer particles are removed until a layer of protecting pebbles and stones, called the desert pavement, has accumulated on the surface. When the soil is barren of vegetation, a surface crust relatively impermeable to water commonly forms. Only the water from long gentle rains sinks into such soil. Elsewhere in the desert are large areas of shifting or partially stabilized sand dunes. There is, therefore, a great variation in the physical characteristics of Desert soils. Those developed on smooth alluvial fans and along broad stream valleys are frequently suitable for farming under irrigation if water can be supplied and if natural drainage conditions are favorable or proper drainage is supplied artificially.

The other great soil groups shown are more or less transitional, with regard to their formation, between these four principal groups—Chernozem, Podzol, Laterite, and Desert soils.

INTRAZONAL SOILS

The soils of the intrazonal groups reflect the influence of some local factor of relief or parent material as well as that of climate and vegetation. In the humid regions the Bog soils occur in very poorly drained areas in which the remains of plants decompose so slowly that thick deposits of them accumulate. With less poor drainage the Half-Bog soils develop under a forest vegetation, and the Wiesenboden (meadow soils) under a grass vegetation. In the arid regions salts accumulate in the poorly drained places, giving rise to saline soils (Solonchak) and alkali soils (Solonetz).

In the humid and subhumid regions, areas of soils of medium to heavy texture have developed on such smooth relief that there is little or no erosion under natural conditions. In such instances the acid leached material accumulates in the surface horizon, and a hardpan or claypan develops beneath it. In normal soils, on the other hand, as the surface soil is gradually removed by erosion the profile gradually sinks into the parent material, and in this way new, fresh minerals are incorporated into the soil from beneath. The soils developed on smooth relief and having a claypan or siltpan are called Planosols. Although during their previous history erosion was too little for the formation of a productive soil, any accelerated erosion after clearing is very serious, because it exposes at the surface the claypan, from which a suitable surface soil for cultivated plants cannot be developed by tillage operations.

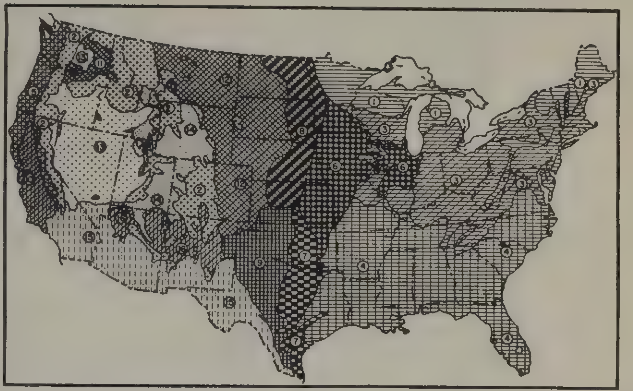
In some places soil is developed from soft limestone or rocks very rich in calcium carbonate. Under such conditions the soil cannot become acid, and grasses form the dominant vegetation even in humid regions. In the United States such black soils, called Rendzina soils, developed from soft calcareous marl or chalk, are found in Alabama and Texas.

AZONAL SOILS

Azonal soils have no well-developed soil charactertistics, largely because of the extreme youth of the parent material. They may be found in any climatic region. Of greatest extent are the Lithosols, very shallow soils consisting largely of an imperfectly weathered mass of fine or coarse rock fragments. These are found especially on steep slopes where little or no true parent material for soil has accumulated, and their characteristics are essentially those of the nearly barren rock. Of great importance agriculturally are the Alluvial soils, those developing from very recently deposited alluvium that has been modified little or not at all by processes of soil formation. Such soils are confined to recent or actively growing deltas or flood plains along streams. As soon as these soils acquire well-developed soil characteristics they are grouped with the appropriate great soil group. Thus a great many different soils, entirely unlike, may be developed from similar alluvium, depending upon the other factors of soil formation, especially the vegetation and climate. Soils developed from well-drained deposits of nearly pure sand are also included with the azonal group as **Dry Sands** because of the similarity of their character wherever they are found.

BROAD ASSOCIATIONS OF SOILS

These several groups of soils in continental United States have been grouped further into broad associations in accordance with their characteristics and their relationships to one another



Broad associations of great soil groups. Each of the associations includes many soils. In a sense these regions may be thought of as broad rural cultural areas with more or less distinct, broadly defined types of farming and rural community organization growing out of the character, proportion, and pattern of the soils that compose them, considering soil in its broadest sense as a synthetic expression of all the environmental factors—parent rock, relief, climate, and vegetation. These regions are described briefly, and the names of the broad units included are given in parentheses.

1. Light-colored leached soils of the northern forested regions with included swamps and stony soils. (Mostly Podzols with associated Lithosols, Bog, and Half-Bog soils.)
2. Leached soils of the high mountains with thin soils on the slopes and areas of various soils in the adjacent valleys. (Various podzolic soils, some Alpine Meadow, much Lithosol, and small irregular areas of Brown, Chestnut, Chernozem, and Prairie soils.)
3. Grayish-brown and brown leached soils of temperate forested regions, with some poorly drained soils and, especially in the southwestern portion, soils with claypans. (Mostly Gray-Brown Podzolic with Brown Podzolic soils in the eastern part, Planosols, especially in the southwestern part, and Wiesenboden, Bog, Half-Bog, and Alluvial soils.)
4. Red and yellow leached soils of the warm-temperate forested regions with poorly drained soils of the Coastal Plains and alluvial soils of the lower Mississippi Valley. (Mostly Red and Yellow Podzolic soils with Ground-Water Podzol, especially in the southeastern part, Bog, Half-Bog, Alluvial soils, and some Rendzina and Wiesenboden.)
5. Red and grayish-brown leached soils of the northwest forested region with much hilly or stony soil and some alluvial soils. (Red and Gray-Brown Podzolic soils, and Lithosols, with some Planosols, Alluvial soils, and other soils.)
6. Dark-colored soils of relatively humid, temperate grasslands with some nearly black, poorly drained soils and some light-colored soils on steep slopes. (Mostly Prairie soils, with some Wiesenboden, Planosols, Gray-Brown Podzolic, and Alluvial soils.)
7. Dark reddish-brown soils of relatively humid warm-temperate grasslands with nearly level black soils on marls and spots of light-colored leached soils. (Reddish-Prairie, Rendzina, and Yellow Podzolic soils, with some Alluvial soils and Wiesenboden.)
8. Dark-colored soils of subhumid temperate grasslands. (Mostly Chernozems.)
9. Dark reddish-brown soils of subhumid warm-temperate grasslands with some hilly soils. (Mostly Reddish-Chestnut soils with some Lithosol.) *(Legend*
10. Dark-colored to light-brown soils of the California valley and coastal mountains. (Chernozem, Prairie, Chestnut, Reddish-Chestnut, Desert, and Alluvial soils, Lithosols, Planosols, etc.)
11. Dark-colored to light-brown soils of the Northwest (Palouse) region. (Chernozem, Prairie, Chestnut, and Brown soils, with some Lithosol.)
12. Brown to dark-brown soils of the semiarid grasslands with some hilly soils, sandy soils, and badlands. (Mostly Chestnut and Brown soils, with some Lithosol, Dry Sands, and other soils.)
13. Grayish soils of the arid West (and Northwest) with soils of arid and semiarid mountains and mountain slopes. (Mostly Sierozem or Gray Desert soils, with much Lithosol and some Brown, Chestnut, and Alluvial soils.)
14. Grayish soils of the arid and semiarid intermountain plateaus and valleys. (Mostly Sierozem or Gray Desert soils and Brown soils, with some Lithosol and other soils.)
15. Reddish soils of the semiarid to arid Southwest. (Red Desert, Reddish-Brown, and Noncalcic Brown soils, with much Lithosol.)
16. Brown to reddish-brown soils of semiarid southwestern high mountain plateaus and valleys. (Mostly Brown and Chestnut soils, with much Lithosol and some Desert and other soils.)

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SOIL CLASSIFICATION

The United States Department of Agriculture in cooperation with the agricultural experiment stations of the States and Territories began over 40 years ago to survey and classify the soils of the United States. In most states the field work and the publications which follow have been joint undertakings between the state and national authorities.

Soil classification is a system of soil nomenclature which takes into consideration all features that appear to the soil scientist to influence the suitability of soils for crops. Soils are dealt with constantly on an area basis.

The scheme of classification outlined on page 603.1 proceeds from the simple to the complex, or from the lower to the higher categories. Of most value to the land appraiser and the layman are the simple units of classification, series and types or categories I and II.

Much of the literature now available was published before the present complete system of soil classification was generally adopted so that it is often necessary to study older data carefully to fit it into the complete system outlined on page 603.1. The old term "soil provinces" usually referred to category I order or zonal soil groups. "Soil areas" referred to in older literature usually are the same as the present category IV, great soil groups.

SIMPLE UNITS OF SOIL CLASSIFICATION AND DEPRECIATION RATES

Soil Series-Category II

The next division below, or smaller than, the great soil groups is the series. The soils included in a series have essentially the same color, depth, and subsoil characteristics. They have the same drainage, and similar topography and conditions of parent material, thus having a common origin. In short, all the soils belonging to a given series are essentially identical in all respects with the exception of texture of the surface or "A" horizon.

The name applied to a series, such as: Miama, Webster, Barnes, Fargo, Holdredge, Reagan, Amarillo, is the most often used in soil identification. Technically, the selection of these proper names for a series is referred to as the Place Name System. The names were originally selected by taking the name of a town, county, or some other political subdivision near the place where the first soil of the series was recognized. It has no significance except as a means of identification.

Category III or soil family refers to a group of related soil series. Category II and III are often confused especially in older literature.

Soil Type-Category I

Each soil series breaks down into soil types. These types are differentiated according to the texture of the surface soil. Thus the type names refer to soil texture, such as: clay, sand, silt, or combinations of these, loam, silt loam, clay loam, etc. (See Digest Page 603.1 for the Characteristics of Soils.)

The soil type is the working unit. It is defined in the same way as a series, with the addition of texture to the limitations. That is, soil type separations are based on all features, both physical and chemical, which can be observed in the field or determined in the laboratory, but the difference between types is based on the size of soil particles.

The chief concern of land appraisers and other fieldmen is with the identification of soil types. Their ability to make sound appraisals and accurate reports will depend largely upon their ability to recognize soil types in the field. Proficiency in doing this is not easy to attain and involves study both in the office and in the field.

A phase of a soil type is occasionally recognized for the division of types to show some minor characteristic. Differences in topography and stoniness are shown frequently as phases. Such variations may not materially influence the soil character but may have great significance in the use that can be made of the land, especially where cultivated.

Thus a phase is a variation from true type which is not sufficiently great to justify establishing a new type.

On the average soil map of a county ranging from 500 to 600 square miles in area, from 15 to 60 soil types and phases may be recognized and mapped.

HIGHER CATEGORIES OF SOIL CLASSIFICATION

Great Soil Groups-Category IV

The great soil groups consist of a group of soil series "differing from one another in important ways because of differences in parent material, relief, and age, but all showing the same general sort of Profile." Category V or suborder refers to a group of related great soil groups.

Order-Category VI

The great soil groups are further grouped and classified in three orders.

1. Zonal - "Zonal soils include those great groups having well developed soil characteristics that reflect the influence of the active factors of soil genesis - climate and living organisms (chiefly vegetation)."
2. Interzonal - "Interzonal soils have more or less well developed soil characteristics that reflect the dominating influence of some local factor of relief or parent material over the normal effect of the climate and vegetation."
3. Azonal - "Azonal soils are without well developed soil characteristics either because of youth or because conditions of parent material or relief prevented the development of definite soil characteristics."

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603.1

CLASSIFICATION OF SOILS ON THE BASIS OF THEIR CHARACTERISTICS

Category VI Order	Category V Suborder	Category IV Great soil groups	Category III Family [1]	Category II Series [1]	Category I Type [1]
Zonal soils Pedocals	Soils of the cold zone	1. Tundra soils			
	1. Light-colored soils of arid regions	2. Desert soils	Mesa	Mesa	Mesa gravelly loam.
				Chipeta	Chipeta silty clay loam.
		3. Red Desert soils	Mohave	Mohave	Mohave loam.
				Reeves	Reeves fine sandy loam.
		4. Sierozem	Portneuf	Portneuf	Portneuf silt loam.
		5. Brown soils	Joplin	Joplin	Joplin loam.
				Weld	Weld loam.
		6. Reddish Brown soils	Springer	Springer	Springer fine sandy loam.
				White House	White House coarse sandy loa
	2. Dark-colored soils of the semi-arid, subhumid, and humid grasslands.	7. Chestnut soils	Rosebud	Rosebud	Rosebud fine sandy loam.
				Keith	Keith silt loam.
		8. Reddish Chestnut soils	Amarillo	Amarillo	Amarillo fine sandy loam.
				Abilene	Abilene clay.
		9. Chernozem soils	Barnes	Barnes	Barnes very fine sandy loam.
		10. Prairie soils	Carrington	Carrington	Carrington loam.
				Tama	Tama silt loam.
		11. Reddish Prairie soils	Zaneis	Zaneis	Zaneis very fine sandy loam.
				Renfrow	Renfrow silt loam.
Pedalfers	3. Soils of the forest-grassland transition.	12. Degraded Chernozem soils			
		13. Noncalcic Brown or Shantung Brown soils.	Holland	Holland	Holland sandy loam.
				Vista	Vista sandy loam.
				Fallbrook	Fallbrook fine sandy loam.
				Sierra	Sierra coarse sandy loam.
			Placentia	Placentia	Placentia fine sandy loam.
				Ramona	Ramona sandy loam.
			Weihaiwei	Weihaiwei	Weihaiwei loam.
				Tinghsien	Tinghsien fine sandy loam.
	4. Light-colored podzolized soils of the timbered regions.	14. Podzol soils	Kalkaska	Kalkaska	Kalkaska loamy sand.
				Au Train	Au Train loamy sand.
			Rubicon	Rubicon	Rubicon sand.
				Roselawn	Roselawn sand.
			Hermon	Hermon	Hermon loam.
				Colton	Colton loamy sand.
				Becket	Becket loam.
		15. Brown Podzolic soils	Gloucester	Gloucester	Gloucester loam.
					Gloucester sandy loam.
				Merrimac	Merrimac sandy loam.
					Merrimac loamy sand.
		16. Gray-Brown Podzolic soils	Miami	Miami	Miami silt loam.
				Fox	Fox silt loam.
				Bellefontaine	Bellefontaine loam.
			Plainfield	Plainfield	Plainfield loamy sand.
				Coloma	Coloma loamy sand.
			Chester	Chester	Chester loam.
				Frederick	Frederick silt loam.
			Porters	Porters	Porters loam.
	5. Lateritic soils of forested warm-temperate and tropical regions.	17. Yellow Podzolic soils	Norfolk	Norfolk	Norfolk sandy loam.
		18. Red Podzolic soils (and Terra Rossa).	Orangeburg	Orangeburg	Orangeburg sandy loam.
				Greenville	Greenville sandy loam.
				Magnolia	Magnolia sandy loam.
				Cecil	Cecil sandy loam.
		19. Yellowish-Brown Lateritic soils	Coto	Coto	Coto clay.
		20. Reddish-Brown Lateritic soils	Bayamón	Bayamón	Bayamón clay.
		21. Laterite soils	Nipe (ferruginous).	Nipe	Nipe clay.
				Rosario	Rosario clay.
Intrazonal soils	1. Halomorphic (saline and alkali soils of imperfectly drained arid regions and littoral deposits.	1. Solonchak or saline soils	Sage	Sage	Sage clay.
			Lahontan	Lahontan	Lahontan clay loam.
				Fresno	Fresno clay loam.
		2. Solonetz soils	Phillips	Phillips	Phillips loam.
				Rhoades	Rhoades loam.
			Beadle	Beadle	Beadle silt loam.
		3. Soloth soils	Arvada	Arvada	Arvada clay loam.
				Beckton	Beckton silty clay loam.
	2. Hydromorphic soils of marshes, swamps, seep areas, and flats.	4. Wiesenböden (Meadow soils)	Clyde	Clyde	Clyde silty clay loam.
				Webster	Webster silty clay loam.
		5. Alpine Meadow soils	Duncom	Duncom	Duncom silt loam.
		6. Bog soils	Edwards	Edwards	Edwards muck.
			Carlisle	Carlisle	Carlisle muck.
				Pamlico	Pamlico muck.
			Greenwood	Greenwood	Greenwood peat.
				Spaulding	Spaulding peat.
		7. Half Bog soils	Maumee	Maumee	Maumee loam.
				Bergland	Bergland loam.
		8. Planosols	Grundy	Grundy	Grundy silt loam.
				Oswego	Oswego silt loam.
			Clermont	Clermont	Clermont silt loam.
				Vigo	Vigo silt loam.
			Crete	Crete	Crete silt loam.
				Idana	Idana silty clay loam.
		9. Ground-Water Podzol soils	Saugatuck	Saugatuck	Saugatuck loamy sand.
				Allendale	Allendale sandy loam.
			Leon	Leon	Leon sand.
				St. Johns	St. Johns loamy sand.
		10. Ground-Water Laterite soils	Tifton	Tifton	Tifton fine sandy loam.
				Caguas	Caguas clay.
	3. Calomorphic	11. Brown Forest soils (Braunerde).	Brooke	Brooke	Brooke clay loam.
			Burton	Burton	Burton loam.
		12. Rendzina soils	Houston	Houston	Houston clay.
				Soller	Soller clay loam.
				Bell	Bell clay.
			Aguilita	Aguilita	Aguilita clay.
				Diablo	Diablo clay.
Azonal soils		1. Lithosols	Underwood	Underwood	Underwood stony loam.
				McCammon	McCammon loam.
			Muskingum	Muskingum	Muskingum stony silt loam.
			Dekalb	Dekalb	Dekalb stony loam.
		2. Alluvial soils	Wabash	Wabash	Wabash clay loam.
				Cass	Cass loam.
			Laurel	Laurel	Laurel fine sandy loam.
				Sarpy	Sarpy very fine sandy loam.
			Sharkey	Sharkey	Sharkey clay.
			Genesee	Genesee	Genesee silt loam.
				Huntington	Huntington silt loam.
			Gila	Gila	Gila very fine sandy loam.
				Pima	Pima silty clay loam.
			Hanford	Hanford	Hanford loam.
				Yolo	Yolo loam.
		3. Sands (dry)			

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[1] Families, series, and types listed are intended only as examples to illustrate the system of classification. When all of the soils of the United States (and of the world as a whole) are studied and classified, many more families, a few thousand series, and thousands of local soil types will have to be recognized.

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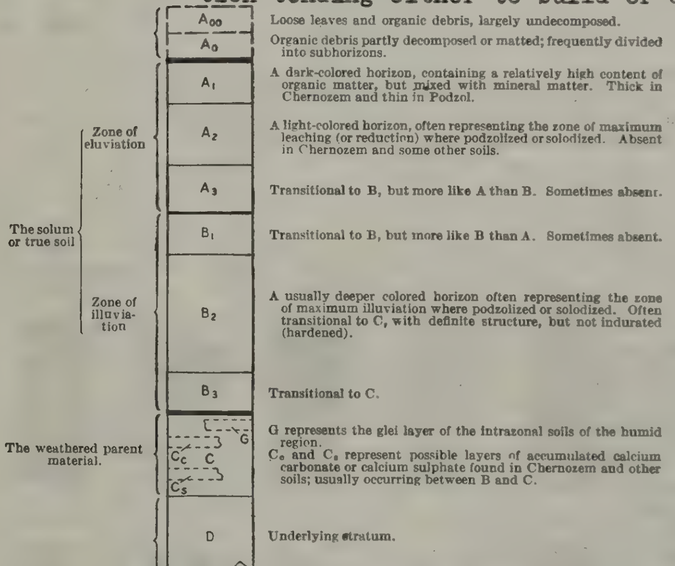
THE NATURE OF SOILS

The old concept of soil as a static and inert body is wholly inadequate. Soils are in a continual process of change and development. There are two major soil forming processes playing upon the soil at all times:

1. Climate - The most important distinct effects of climate are on the weathering of rocks and alteration of parent material . . It directly "affects the type of weathering of rocks and the removal and redistribution of material by water, wind and glaciers and is responsible for the establishment of percolation of water through the soil."
2. Living Organism -
   a - Biological Activity - "Two of the chief functions of plant and animal life, so far as soil profile development is concerned, are the furnishing of organic matter for the soil and the bringing in of plant nutrients from the lower layers to the upper ones."
      1. Plants -"The primary source of soil organic matter is the vegetation that develops on it and modifies the color of practically all soils"
      2. Animals - "Animals play a role of secondary importance in soil formation, but their total influence is very great. They furnish one step in converting plant remains into soil organic matter . . "

   b - Micro-Organism - "One of the most important functions of micro-organisms (bacteria, fungi, protozoa, etc.), is that of changing raw vegetable waste into soil organic matter."
   In addition the nitrogen-fixing bacteria actually builds up the fertility of the soil by fixing atmospheric nitrogen in the soil in a form that can be used by higher plants.
   Under natural conditions it is estimated that it took Nature 400 to 1000 years to build one inch of topsoil. It has thus taken centuries to build the rich soil mantle which farmers have too often wasted in less than 50 years. The future of the soils of a locality depends upon the effectiveness with which farmers control the forces constantly in operation tending either to build or destroy soils and soil productivity.


A_{00}
Loose leaves and organic debris, largely undecomposed.
A_0
Organic debris partly decomposed or matted; frequently divided into subhorizons.
A_1
A dark-colored horizon, containing a relatively high content of organic matter, but mixed with mineral matter. Thick in Chernozem and thin in Podzol.
Zone of eluviation
A_2
A light-colored horizon, often representing the zone of maximum leaching (or reduction) where podzolized or solodized. Absent in Chernozem and some other soils.
A_3
Transitional to B, but more like A than B. Sometimes absent.
The solum or true soil
B_1
Transitional to B, but more like B than A. Sometimes absent.
Zone of illuviation
B_2
A usually deeper colored horizon often representing the zone of maximum illuviation where podzolized or solodized. Often transitional to C, with definite structure, but not indurated (hardened).
B_3
Transitional to C.
The weathered parent material.
G
C_c
C
C_s
G represents the glei layer of the intrazonal soils of the humid region.
C_c and C_s represent possible layers of accumulated calcium carbonate or calcium sulphate found in Chernozem and other soils; usually occurring between B and C.
D
Underlying stratum.

Soil Profile Showing Horizons

Important subdivisions of the main horizons are conveniently indicated by extra numerals, thus: A_{31} and A_{32} represent subhorizons within A_3.

SOIL PROFILE

The usual soil is made up of layers beginning with the surface soil and continuing down to the underlying material. The term "soil profile" refers to a vertical section of the soil showing these layers which are normally referred to as horizons.(See graphic picture)

COLOR OF SOILS

Color is the most apparent soil characteristic. This does not mean that it is easy to recognize. In fact the opposite is true, for there are highly important but not easily recognizable shades, and moreover, colors alter with changes in moisture content. Color is one of the indicators of producing capacity and is therefore important.

Black is commonly, though not always, associated with productivity. The dark colors normally depend upon the amount and character of organic matter, or humus. These are usually due to the presence of black pigments formed in the decay of vegetable matter.

Yellow soil normally indicates a soil with poor drainage or one developed under poor drainage. The color is dependent on the presence of hydrated iron oxide and the inherent productivity is low.

Gray and associated grayish-blue and drab soil colors may be due to the lack of sufficient oxygen or too low content of organic matter and iron. In humid regions these colors usually indicate poor drainage, but in arid regions they may be due to scanty vegetation growth. Soil productivity is usually quite limited.

There are many other color variations, ranging from black to white, dependent upon innumerable factors.

Quotations & picture from U.S.D.A. Yearbook of Agriculture, 1938.

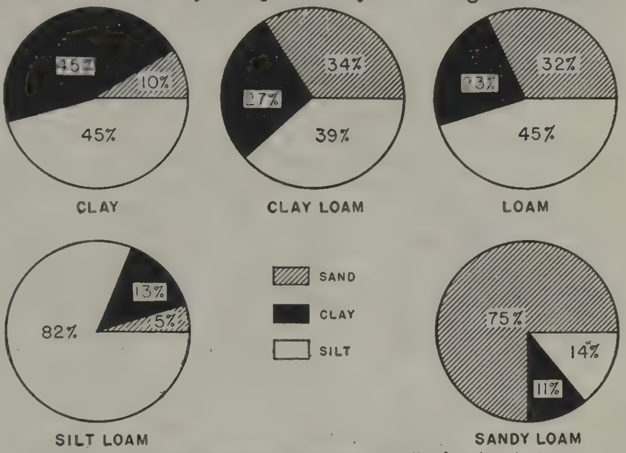
THE TEXTURE OF SOILS

Texture refers to the size of individual soil particles. Soil texture has no direct relationship to color, with which it is so commonly and wrongly associated. To many, a red or yellow soil is clay, whereas these colors may be found in dune sand formations or other very loose and friable soils.

Soil particles are divided into three principal groups depending on the diameter of the individual grain. Thus -

Sand is coarse and has a diameter of 2.0 to .05 m.m.
Silt is medium and has a diameter of .5 to .002 m.m.
Clay is fine and has a diameter of .002 or less m.m.

"The coarse and medium materials are comparatively inactive, serving mainly as a supporting framework of the rest of the soil. A much more complicated function is served by the fine or clay fraction, the chief component of which is colloidal in nature. It serves as the bank in which plant nutrients may be placed for future need and from which they may be withdrawn when the plant needs them. With good colloids the capacity for storage is great; with poor ones it is small. The kind and quantity of colloidal material largely determines how much water can be held in the soil, especially in regions where rainfall is limited."



Percent of sand, silt, and clay in soils of various textures.

"Sand grains feel gritty to the fingers and can be distinguished without difficulty by the unaided eye. Silt, barely visible to the naked eye, has the appearance and feel of flour. The individual particles of the clay fraction are not distinguishable by the eye, and a large proportion of them are too small to be seen under the microscope. It is this fraction that makes soils sticky when wet."

"Varying proportions of these particles of different sizes determine our classes of soils, or what is known as soil texture. The principal classes in the order of the increasing content of silt and clay are as follows: sand, loamy sand, sandy loam, silt loam, clay loam, and clay."

It should be understood that modifying words may often be required in defining textures, for example, fine sand, or very fine sand. Combinations of the above terms are sometimes necessary, as silty clay loam. However, the number of textural separations attempted should be held to a minimum.

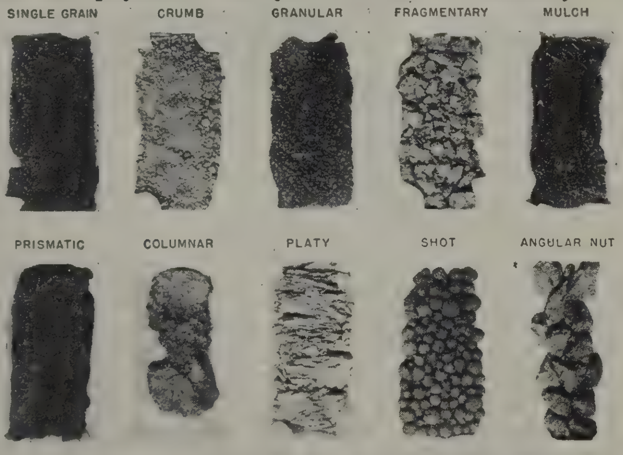
Local terms, such as "gumbo", "black wax", "stick", "buckshot", and "adobe", are often used. These terms carry various meanings which are sometimes not the same in different localities, and when used should be fully explained.

While texture in the field is based on judgment arrived at largely through the sense of touch, it can be and is checked by mechanical and physical analysis in the laboratory.

STRUCTURE OF SOILS

Structure refers to the arrangement of soil particles within the soil mass. Although some soils do not have a definite structure, the size, shape, and stability of the soil aggregates normally have a direct influence on soil productivity.

"The granular and crumb structures are the most favorable for the growth of crop plants. Such types of structure normally develop under grass or other close-growing vegetation, but crumb structure may be found in soil under forest growth, particularly where there is a dense ground cover. In ordinary farm practice, the development and maintenance of favorable soil structure is associated with the growing of grasses and legumes. Such crops have not held as important a place in our rotations as they deserve, but they will become more important as time goes on and the functions of soil structure in soil productivity are more fully realized."



Several important types of soil structure. All of these structural types are produced through the operation of soil-building processes, except that the single grain and fragmentary may be developed or may be inherited from the parent material. (About one-fourth actual size.)

Quotations, pictures & graph from U.S.D.A. Yearbook, 1938.

SOIL FERTILITY MANAGEMENT

One of the greatest problems of crop production today is how to determine the amount of plant food actually required for highest yields at the lowest cost. An exact answer in pounds of fertilizer is impossible because of so many variables. It is necessary to study several factors before an intelligent decision can be made.

FACTORS TO BE CONSIDERED

- A crop yield goal based on high or above average yields in your area
- Soil tests as a guide for initial fertility improvement.
- Texture and structure of soil.
- Amount of nitrogen released annually from organic matter
- Amount of nitrogen added by legumes
- Farm manure.
- Carry-over of previous fertilizers
- Plant food removed by various crops
- Amount of leaching.
- Type of fertilizer material

MAKING USE OF SOIL TESTS

Soil tests are starting points for soil fertility improvement. A well equipped soils laboratory can determine the general nutrient level of any soil. Repeat tests every 4 to 8 years. More frequent tests may be beneficial on some crop rotations.

To get the most out of a soil test, additional information must be furnished with the sample to be tested. Include:

- Depth of soil sample
- Whether bottom land or upland
- Drainage condition
- Cropping practice
- Rate and time of past plant food application.

Laboratory Recommendations will probably state a high and low requirement. Generally the high side of the recommendation will be most profitable, if you have the money.

Consider both the type of crop to be grown and the kind of fertilizer applied. As a general rule, the larger the root system a plant has, the less emphasis needed on proper placement.

Phosphate and potash are "fixed" or held by the soil particles. This means that part of these crop nutrients is absorbed by the fine soil particles and is unavailable to plants at least for a short time. Also it means they are not easily lost through soil drainage. These elements should be applied in excess of crop requirements. They will then gradually become available for plant use over a period of time.

Nitrogen is the most water soluble of the three major elements. Much of it dissolves in the soil water and moves with the soil moisture. Nitrogen should be applied frequently.

LIME REQUIREMENTS

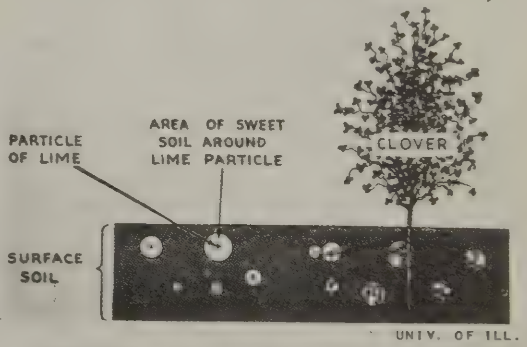
Slightly acid soil will generally make the most efficient use of fertilizers. A pH of 6.5 to 6.8 is best for most crops. Always have your soil tested for acidity before lime application is made. Never over-lime --it may do more harm than good.

Correcting soil acidity is a rather slow process because of the small proportion of limestone added to the soil. An application of 3 tons gives only 6000 pounds of limestone to correct the acidity of 2 million pounds of soil in one acre (the weight of the top 6 2/3 inches.)

When the limestone particles are scattered through the soil, each particle begins to correct the acidity of the soil surrounding it. Zones of acid soil will be found between these areas of sweet soil.

The soil sweetening process may require 4 years or more to complete. But clover can be grown successfully soon after limestone is applied. Testing again in 8 to 9 years is soon enough under most soil management systems.

HOW LIMESTONE WORKS



UNIV. OF ILL.

Because of its slow action it is best to apply limestone six months to a year ahead of the legume seeding. But, don't put if off -- put it on any time! Finely ground limestone is best because a larger number of particles will be scattered through the soil.

SOIL TEXTURE AND STRUCTURE

Texture and structure are two major influences on fertilizer efficiency. The size of the particles making up a soil determines its texture. Sands are the largest and clays the smallest. In between these extremes are the silts.

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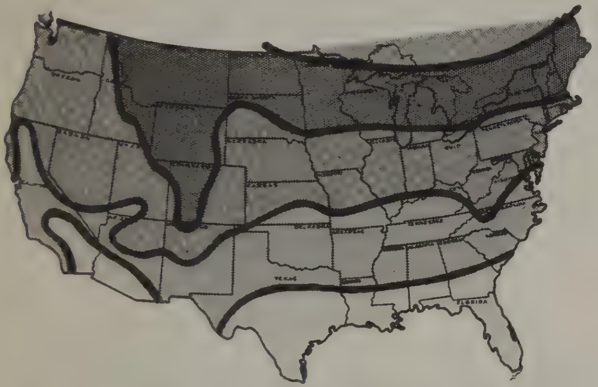
PLANT FOOD RESERVE

Soils having a high proportion of sand have very low plant food holding capacity, but give it up quickly to growing crops. Soils made up mostly of clay have high plant food holding capacities, thus resisting the loss of nutrients through water percolation or leaching.

Soil structure is an important factor in efficient fertilizer utilization. A soil fertility program based only on supplying plant food is not sound. Roots should be able to grow freely. Grasses or legumes in the rotation will help to loosen tight soils.

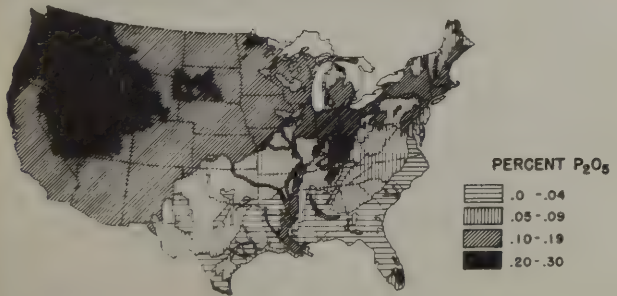
Organic matter is that material built up by plants and animals, such as straw, manure, leaves, cornstalks, soil organisms, or insects.

The percentage organic matter is a guide to the amount of nitrogen in the soil. The southern regions of the United States are low in organic matter, mainly because high temperatures cause rapid decay and keep it "burned" out.



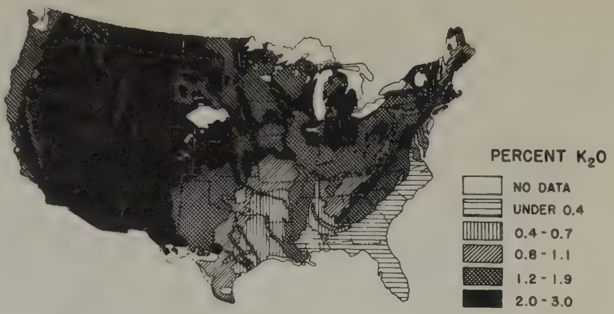
ORGANIC MATTER CONTENT OF SOIL

Phosphate content is abundant in the western regions. Usually, phosphate fertilization gives most benefit in the light regions shown on the map. Low phosphate areas should have phosphate applied more heavily.



PHOSPHORIC ACID IN SURFACE FOOT OF SOIL
(PHOSPHATE)

Potash content is high in the western regions. In the southeastern states where rainfall, temperature and crop yields have been high, much of the potash has been leached from the soil.



POTASH IN SURFACE FOOT OF SOIL

Organic matter tests give an idea of the amount of nitrogen being released during the growing season. About 5 per cent of the stable organic matter in the soil is nitrogen. Approximately 2 to 3 per cent of this total nitrogen is released annually.

The table shows the average amount of nitrogen released from various percentages of organic matter. The lower figure is normal for an unfavorable growing season while the upper figure is normal in a favorable season.

*POUNDS OF NITROGEN RELEASED THROUGH AVERAGE GROWING SEASON **

Per Cent Organic Matter	*Silt Loam*	*Clay And Clay Loam*	*Sands And Sandy Loam*
.5	7.5- 15	6.25- 12.50	20-30
1.0	15.0- 30	12.50- 25	40-60
1.5	22.5- 45	18.50- 37	60-90
2.0	30.0- 60	25.0 - 50	80-120
2.5	37.5- 75	31.25- 62.50	Sandy soils seldom have over 1½ % organic matter
3.0	45.0- 90	37.50- 75.00	
3.5	52.5-105	43.75- 87.50	
4.0	60.0-120	50.00-100.00	
4.5	67.5-135	56.25-112.50	
5.0	75.0-150	62.50-125.00	

** Use low side of range for crops which grow mostly in the cool season, such as small grains.* UNIV. OF MO.

Most crop rotations include a legume. These legumes may add a great deal of nitrogen to the soil. The amount of nitrogen added will depend on the type of legume, the crop stand, how well the legume is inoculated and the nitrogen content of the soil. Legumes are lazy. They will take more nitrogen from the soil rather than from the air if soils can supply it to them.

When a legume hay or silage crop is removed little nitrogen is added to the soil. Little nitrogen is lost on the other hand.

*ESTIMATED NITROGEN RELEASED FROM GREEN LEGUMES TURNED UNDER **

Crop	*Entire Crop (lbs. N)*	*Pastured (lbs. N)*
Alfalfa	40	30
Sweet Clover	40	30
Red Clover	30	20
Ladino	30	20
Lespedeza	20	15
Vetch	60-70	-

** Some residual effect will probably last through second year.* UNIV. OF MO. & OKLA. A.& M.

PLANT FOOD LOSS

FARM MANURE

The value of manure will vary depending on the kind of feed used. The following table gives average values for various animals.

YEARLY EXCRETION PER 1000 LBS.. LIVESTOCK (FECES)

Animal	Nitrogen	Phosphate	Potash
Horse (1)	69	35	47
Cow (1)	66	35	23
Steer (1)	68	51	16
Hog	112	97	61
Sheep (2)	56	32	23
Chicken	90	83	37

(1) 50 per cent is usually dropped on pastures and uncultivated fields.

(2) 80 to 90 per cent is usually dropped on pasture.

UNIV. OF ILL. & USDA

When all liquid manure is saved from cattle and sheep, double the amount of nitrogen and triple the amount of potash shown in the table. When it is saved from horses and hogs, add one-half the above nitrogen and two-thirds the above potash. Urine contains practically no phosphate.

About 50 per cent of the nitrogen and phosphorus and 90 per cent of the potassium in manure are soluble in water and subject to leaching. In figuring the amount of plant food returned to the soil through manure, loss by leaching should be figured. The table below shows the losses when manure is handled in different ways.

LOSSES FROM MANURE

	Nitrogen Per Cent	Phosphate Per Cent	Potash Per Cent
Leaching from piles	15-30	10-40	20-60
Heating in piles	15-35	None	None
Drying after spreading	15-35	None	None
Freezing after spreading	5-20	None	None

UNIV. OF ILL. & USDA

On the average, 75 per cent of the nitrogen, 80 per cent of the phosphorus and 90 per cent of the potash in most feeds are excreted in the manure.

CARRY-OVER OF FERTILIZERS

Full benefit from phosphate and potash is not obtained the first year. Rock phosphate may become available over a period of 7 years. Super phosphate, although readily available, may show some benefits during the second and third year. Potash will probably become available over a period of 5 years. The amount of potash available per year will decrease from the first year to the 5th year. Nitrogen that is not tied up in organic residues will not ordinarily produce much benefit after the first year.

Most of the phosphate and potash not used by one year's crop can be recovered by the following crop.

PLANT FOOD REMOVED BY CROPS

Crop		Unit	Nitrogen Pounds	Phosphate (P_2U_5) Pounds	Potash (K_2O) Pounds
Barley	Grain (1)	10 bu.	8.4	3.9	2.5
	Straw	550#	3.3	1.1	6.8
Corn	Grain	10 bu.	9.2	3.7	2.4
	Straw	650#	5.5	1.6	7.0
Cotton	Lint	500#	1.5	0.3	2.5
	Seed	1000#	31.5	5.7	9.5
	Stalks, etc.	1500#	27.0	7.0	36.0
Flax	Grain	10 bu.	25.2	6.7	5.3
	Straw	1100#	10.2	2.6	23.2
Grain sorghum	Grain	10 bu.	8.3	5.0	1.8
	forage	1000#	10.3	3.3	15.8
Oats	Grain	10 bu.	6.1	2.5	1.8
	Straw	350#	2.2	0.9	5.2
Rye	Grain	10 bu.	10.9	5.0	3.7
	Straw	1100#	4.9	3.3	10.1
Soybeans	Seed	10 bu.	38.2	8.5	11.1
	Straw	1200#	16.6	3.7	7.1
Soybean hay		1 ton	50.4	12.4	25.6
Tobacco	Leaves	1000#	45.0	3.5	61.0
	Stems	833#			
Peanuts	Nuts Vines	1000#	46.6	8.3	31.7
Potatoes, Irish, tubers		200 bu.	42.0	6.3	53.0
Potatoes, Sweet, tubers		100 bu.	17.5	2.5	25.5
Sugar Beets	Beets	1 ton	3.3	1.7	6.7
	Tops	1000#	4.5	2.6	8.4
Forages -- 1 ton, dry Hay basis					
Ladino clover *			71.2	14.2	54.0
Alfalfa *			58.0	8.2	46.6
Birdsfoot trefoil *			55.0	9.2	40.3
Red clover *			55.2	7.8	47.8
Lespedeza *			40.4	6.6	22.8
Cowpeas *			63.0	13.0	45.0
Sweet Clover*(annual)			49.4	10.5	34.0
biennial (mature)			39.4	7.8	44.6
biennial (2nd spring)			78.6	11.9	43.2
Crimson clover *			45.0	12.0	45.0
Brome grass			29.8	7.8	53.4
Kentucky bluegrass			29.4	8.7	39.6
Timothy			19.6	6.9	37.9
Red top			21.2	7.8	38.4
Orchard grass			19.4	8.2	45.8
Alta fescue			29.0	8.2	43.4

* Properly innoculated legumes will take 70 per cent of nitrogen from air.

(1) Grain-straw proportion for productive soils.

Source of data: UNIV. OF ILL.; UNIV. OF GA.; N. DAK. STA. COLLEGE; SUGAR BEET FOUNDATION; FARMERS HANDBOOK, WHITE.

LEACHING

Nitrogen suffers the greatest loss from leaching -- in general 10-50 per cent of the nitrogen added may be lost through leaching and erosion. Potash losses are generally large in sandy or high rainfall areas. But on most soils the loss is slight. Phosphate does not leach to any extent.

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FERTILIZER SELECTION

All state fertilizer laws require registration and accurate labeling of fertilizer brands and grades and a guaranteed percentage of nitrogen, phosphate and potash. Check labels on the bag for accurate analysis. The tables below list the average content of the plant food in various types of fertilizers.

COMPOSITION AND RELATIVE VALUE OF CERTAIN NITROGEN MATERIALS (1)

Material	% of Total Nitrogen	Acidity or Alkalinity	Retention in Soil
Ammonium nitrate	32	Acid	Medium
Ammonium phosphate	11-16	Acid	High
Ammoniated superphosphate	2-6	Acid	High
Anhydrous ammonia	82	Acid	High
Aqua ammonia	25	Acid	High
Calcium nitrate	15.5	Alkaline	Low
Cottonseed meal	5.7	Acid	V. High
Cyanamid	21	Alkaline	High
Nitrate of soda	16	Alkaline	Low
Nitrate of potash	13	Alkaline	Low
Nitrogen solutions	37-46	Acid	Medium
Sulfate of ammonia	20-21	Acid	High
Urea or uramon	42	Acid	Poor

COMPOSITION AND RELATIVE VALUE OF CERTAIN PHOSPHATIC MATERIALS (1)

Material	Phosphate Per Cent	Residual Effect In Soil
Normal or single superphosphate	16-20	Neutral
Triple or treble superphosphate	40-48	Neutral
Rock Phosphate	30-36 (2)	Alkaline
Colloidal phosphate	18-23 (2)	Alkaline
Raw bonemeal	22 (2)	Alkaline
Basic slag	8-18 (2)	Alkaline
Ammoniated superphosphate	18	Acid
Calcium metaphosphate	62-64 (2)	Neutral

THE POTASH CONTENT OF DIFFERENT FERTILIZER MATERIALS (1)

Material	% of Potash
Muriate of potash	48-62
Sulfate of potash	48-52
Nitrate of soda and potash	12-14
Manure salts	22-32
Nitrate of potash	44-45
Potassium phosphate	30-50
Sulphate of potash magnesia	22-30
Kainit	12-20

(1) Data from McVickar's "Using Commercial Fertilizer"
(2) Total P_2O_5

BULK APPLICATION

"Bulk" fertilization has been found more economical than "bag" fertilization on many farms. The savings in bag costs and labor costs are great on large-scale operations. Special handling and equipment is required for anhydrous ammonia and some other liquid nitrogen fertilizers.. Custom application may be more economical on small farms.

HIGH ANALYSIS

Recent developments have made it possible to manufacture more concentrated fertilizers. Ammoniation and synthetic nitrogen products are being used to increase the per cent of plant food in many grades.

These more concentrated fertilizers have many advantages. Costs are usually lower per pound of plant food because higher concentration means less shipping costs. Also handling, bagging and storage costs are down.

Low analysis fertilizers may have an advantage of more trace and secondary elements.

HOW MUCH IS TOO MUCH?

All of the required plant foods should be applied in the right proportion. Too much of one element alone will not increase yields. It pays to use fertilizer as long as your increased yields and quality are worth more than the cost of applying the fertilizer. When crop prices are high in relation to fertilizer cost, you can afford to use larger application rates.

WHEN TO APPLY

In general the more leach-resistant the fertilizer, the less importance need be placed on application time. Phosphate and potash fertilizers are usually best applied in the slack season. Nitrogen fertilizers containing ammonia are less apt to leach and may be applied before planting. Split applications of nitrates are generally recommended, since they are easily soluble and tend to leach quickly.

BUYING A FARM - - BY THE TON

The purchase price of many farms with depleted and middle grade soils is only a part of the capital investment that must be made.

An additional $30 to $50 per acre for lime, phosphate and potash is often needed to bring the land to the highest practical level of fertility. This amount should be considered part of the capital investment -- not as part of the annual cost of producing the crop.

After the initial build-up, annual plant food applications should be planned to maintain the higher level. With high land prices, the fertility building approach must be used. It is cheaper to build fertility than to buy land.

INCREASING RENTAL RATE

Rental values vary according to the crop producing ability of the soil. To push up the rental value, the land owner should stand the expense of building a high level of fertility. The renter then should stand his share of the expense of annual maintenance. For example, a land owner may have a farm which usually produced 30 bushels of corn per acre. He may be receiving one-third of the crop as his share. If he builds his fertility level to a normal 80 bushel crop he may be able to ask for one-half the crop. Both the renter and the land owner can profit.

A BALANCED SOIL PROGRAM

High priced land must pay for itself. The big problem is to get high crop yields over a period of years. Every crop takes large amounts of valuable plant food from the soil. Continued effort is needed to balance these losses with additions of fertilizers and organic matter. The table below shows average amounts of plant food removed by various crops.

TABLE I -- PLANT FOODS REMOVED BY CROPS

	Crop Unit	Nitrogen (N) (Lbs.)	Phosphoric Acid (P_2O_5) (Lbs.)	Potash (K_2O) (Lbs.)
Corn (grain)	1 bu.	.95	.36	.25
Corn (stalks)	1 ton	20.00	6.00	28.00
Oats (grain)	1 bu.	.70	.39	.20
Oats (straw)	1 ton	12.00	4.00	28.00
Wheat (grain)	1 bu.	1.10	.50	.30
Wheat (straw)	1 ton	10.00	3.00	16.00
Barley (grain)	1 bu.	.85	.37	.25
Barley (straw)	1 ton	15.00	5.00	30.00
Rye (grain)	1 bu.	1.00	.50	.30
Rye (straw)	1 ton	10.00	6.00	16.00
Soybeans (grain)	1 bu.	4.00	1.60	1.75
Cowpeas (grain)	1 bu.	2.00	.60	1.00
Buckwheat	1 bu.	.75	.30	.15
Alfalfa	1 ton	*	10.00	43.00
Clover	1 ton	*	10.00	38.00
Lespedeza	1 ton	*	10.00	23.00
Soybean Hay	1 ton	*	13.50	22.00
Timothy	1 ton	26.60	8.00	30.00
Bluegrass	1 ton	27.00	11.00	42.00
Cotton (lint & seed)	1 ton	54.00	24.00	60.00
Cotton (stalks & leaves)	1 ton	36.00	9.30	48.00
Peanuts (nuts)	1 ton	60.00	10.00	10.00
Peanuts (vines)	1 ton	40.00	5.00	40.00
Sugar beets (roots)	1 ton	4.00	1.50	4.00
Tobacco (leaves)	1 ton	80.00	10.00	110.00

*See Table II

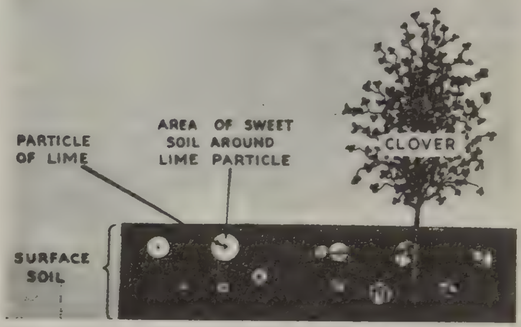
These figures vary widely under different moisture and soil conditions. This table shows averages -- included only as a general guide for those working out a detailed fertility balance.

TEST FOR ACIDITY--APPLY LIME WHERE NEEDED

It is very poor management to spread lime before testing to see if it is needed. Correcting soil acidity is a rather slow process because of the small proportion of limestone to soil. Even an application of 3 tons gives only 6000 pounds of limestone to correct the acidity of 2 million pounds of soil in one acre (the weight of the top 6-2/3 inches). When the limestone particles are scattered through the soil, each particle begins to correct the acidity of the soil surrounding it. Zones of acid soil will still be found between these areas of sweet soil.

The soil sweetening process may require 4 years or more to complete. However, clover can secure enough lime from the sweet areas several months after limestone is applied. Testing again in 8 to 9 years is soon enough under most soil management systems.

HOW LIMESTONE WORKS



Because of its slow action it is best to apply limestone six months to a year ahead of the clover seeding. But, don't put it off -- put it on, anytime! Finely ground limestone is best because a larger number of particles will be scattered through the soil.

SUPPLY ORGANIC MATTER AND NITROGEN

Grow heavy crops of legumes in the rotation. Always inoculate with the proper bacteria. Inoculation compounds on the market clearly tell the crops for which they are intended. These bacteria enable the legume to obtain about two-thirds of its nitrogen from the air. This will replace part of the nitrogen removed from the soil when legumes are harvested. When legumes are pastured or plowed under as green manure, nitrogen is added to the soil in the amounts shown in the table.

TABLE II -- NITROGEN GAINS & LOSSES FROM LEGUMES

Crop	Unit	Sold	Pastured	Plowed Under
Soybeans (grain)	1 bu.	+ .2	--	--
Soybeans (hay)	1 ton	-13.6	--	+ 36.8
Alfalfa	1 ton	- 3.7	+ 39.0	+ 52.0
Red Clover	1 ton	- 2.2	+ 30.6	+ 40.8
Lespedeza	1 ton	-11.0	+ 24.0	+ 32.0
Sweet Clover				
Fall, 1st Year	1 ton	---	--	+100.0
Spring, 2nd Year	1 ton	--	--	+115.0
Fall, 2nd Year	1 ton	--	+ 26.0	+ 35.0

Figures are on a dry hay basis. Average production for a heavy stand of sweet clover is: 1st year, 1 ton when seeded with nurse crop or 1½ tons seeded alone; 2nd year after July 1, 4½ tons. Source: Univ. of Ill.

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A BALANCED SOIL PROGRAM

Clovers are your nitrogen factory. They produce large amounts of nitrogen and organic matter at low cost. A heavy crop of clover should be grown at least once every 4 years -- more often on less fertile soils.

In addition, return all manure, straw and other crop residue to your soil. The value of manure varies greatly with the way it is handled. Study pages 620-621. The table shows the value of manure produced by different types of livestock when properly handled.

TABLE III -- FERTILIZER VALUE OF MANURE

Livestock	Tons Produced per month per head in barn	Lb. Organic Matter per ton	Lb. per ton		
			Nitrogen	Phosphoric Acid	Potash
Cows	1.0	340	10	4	7
Steers	.8	340	13	8	7
Horses	1.2	520	13	5	15
Hogs (Sows)	.4	280	10	7	13
Sheep	.12	680	21	6	19
Poultry	.01	900	20	16	8

TEST FOR PHOSPHORUS--APPLY WHERE NEEDED

The phosphorus test tells how much of this element is available for plants to use. Rock phosphate is the cheapest source of phosphorus. It works best on fertile Corn Belt soils when legumes are grown. Although effective for 8 to 10 years, it becomes available to plants slowly. Addition of superphosphate is usually needed for crops like wheat that require large amounts of phosphorus. On shelly or alkali soils, superphosphate should be used.

Soils vary in their ability to make rock phosphate available to plants. Follow the usual practice in your area or consult your county agent or agricultural college before using it on your farm.

TEST FOR POTASSIUM--APPLY WHERE NEEDED

Many soils have large available reserves of potassium. On other soils, years of heavy cropping have produced a shortage of this element. Testing is the surest way to find out what your soil needs. Muriate of potash is usually the cheapest source of this plant food element although any fertilizer carrying potassium will give good results if enough is used to supply the plant's needs.

Soil testing service is available through county agents, farm bureaus, high school vocational agriculture departments, or your state agricultural college. They will test your soil using the standard methods and make fertilizer recommendations for a small fee. Fall is a good time to collect soil samples and have them tested.

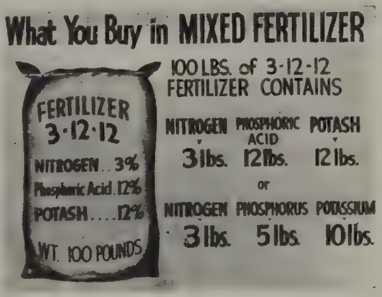
FERTILIZER COMPOUNDS

Plant nutrients in fertilizer do not exist as nitrogen, phosphoric acid or potash because they are not stable when exposed to air. They must be sold in the form of compounds as listed below.

TABLE IV -- FERTILIZER MATERIALS

	Per Cent	Lb. per ton
Nitrogen Materials	Nitrogen (N)	
Ammonium Nitrate	32.5	650
Ammonium Sulfate	20.5	410
Anhydrous Ammonia	81	1620
Cyanamid	21	420
Nitrate of Soda	16	320
Urea Compounds	42 to 46	840 to 920
Cal Nitro	16 to 20.5	320 to 410
Phosphate Materials	Phosphoric Acid (P_2O_5)	
Rock Phosphate	30 to 32	600 to 640
Superphosphate	18 to 20	360 to 400
Superphosphate	32	640
Treble Superphosphate	40 to 50	800 to 1000
Potash Materials	Potash (K_2O)	
Muriate of Potash (Potassium Chloride)	50 to 60	1000 to 1200
Potassium Sulfate	48	960
Hardwood Ashes	2 to 8	40 to 80

These compounds are mixed together to produce various grades of mixed fertilizers. Since plants differ in plant food needs, various combinations of mixed fertilizers are on the market. Fertilizer should be bought on the basis of chemical analysis guaranteed by the manufacturer. The high analysis fertilizers are usually the better buy.



Pounds of phosphoric acid multiplied by 43.66 percent gives pounds of phosphorus (12 × 43.66% = 5.24). Pounds of potash times 83 percent gives pounds of potassium (12 × 83% = 10).

Before using mixed fertilizers, balance your soil with needed limestone, phosphate, muriate of potash and organic matter. Mixed fertilizers are a supplement, not a substitute for these basic soil builders. Recommendations for using mixed fertilizers vary widely with different soils and crops. Consider the plant food needs of your crop and how well your soil can hold the fertilizer you apply.

FERTILIZING FIELD CROPS

CHOICE OF FERTILIZERS

Several factors affect the proper choice of analysis and quantity. The nature of both soil and crop are important, also the amount and kinds of manure or crop residues plowed under, and certain climatic and economic factors. The need for potash is relatively high on muck and low on heavy clays.. Nitrogen is less needed on dark than on light colored soils. Sandy soils are apt to be relatively deficient in all three elements. Liming soils often increases the need for potash, and may decrease response to phosphoric acid if the soil reaction is raised to pH 7 or above. Fertilizers generally show higher response on soils of low or medium fertility than on those of high fertility.

Animal manures contain relatively more nitrogen and potash than phosphoric acid, and require supplementing with high phosphate fertilizers. Leguminous crop residues decrease the need for nitrogen.

Crops differ in their response to the different elements. Wheat shows relatively high response to phosphoric acid, potatoes and corn to potash, and grasses to nitrogen. Some crops such as oats and soybeans show a low response to fertilizers in general, others like wheat and tobacco a high response. Heavier applications can be made profitably to high acre-value crops such as potatoes and vegetable crops than to low value crops like oats and hay. Crops making considerable growth in the early spring require more nitrogen than crops making most of their growth during warm weather. Similarly, an early planted crop needs more nitrogen than if the same crop is planted late. Quick growing crops such as lettuce and spinach require more fertilizer than slow growing crops like corn and hay. Legumes can fix air nitrogen and need minerals chiefly.

Nitrogen is most needed in cool seasons and in wet years with much leaching. Potash pays best in seasons that are abnormally cool or wet. Phosphates hasten maturity, particularly benefiting small grains in years of midsummer drouth, and corn in years of early frosts.

In periods when crop prices are low compared to fertilizers, less fertilizer can be used profitably than when the opposite relation exists.

Plants Show What Is Needed

	When Correctly Balanced	When Too Much Or Unbalanced	When Not Enough
Nitrogen	Increases growth. Increases bloom. Increases total yields. Foliage dark green.	Sappy growth. Tendency to lodge. Susceptible to disease. May not set fruit. Plants may suffer in times of short water. Poor quality of fruit, [illegible]	Foliage pale green. Stunted growth.
Phosphates	Accelerates fruiting. Encourages root action. Strengthens the stem. Gives sounder fruit. Reduces tendency to disease. Makes for more nutritious plants. Gives body and stability to bloom. Hastens maturity.		Where phosphates are deficient, it is rather difficult to recognise the symptoms until it is too late. The fruit does not set, the stems have a purplish cast, and the grain is scanty.
Potash	Increases sugar and starch. Increases root system. Improves bloom. Gives sounder fruit. Gives more weight to grain.	Delays maturity	The edges of the leaves become brown without withering in the early stages. Grasses, corn, wheat, oats, sudan, and other long leafed plants will show brown tongues shooting from the base to the tips of the leaves. Legumes will show white spots on the under side of the leaves.
Iron	UNITED STATES DEPT. OF AGRICULTURE		Leaves pale with the veins dark green.

RECOMMENDED USE OF THE STANDARD FERTILIZERS FOR FIELD CROPS

I.—MODIFYING CONDITIONS:

Column "manured or clovered" assumes that:

1. Eight tons or more per acre of well preserved farm manure was used on the immediate crop or in preceding year;

or 2. A full crop of clover, or other legume, green or mature, was plowed under for the immediate crop;

or 3. Both.

II.—RATE

Figures directly beneath the analyses are rates in pounds per acre.

For one and a half- or double-strength fertilizers, the rate will be two-thirds or one-half that stipulated below, respectively.

III.—ANALYSIS

1. The series of figures in the analyses expresses the percentages of total nitrogen, available phosphoric acid, and water soluble potash, respectively.

2. "Nitrogen" to be applied in any readily available form. Thus 20 pounds of nitrogen could be supplied by the use of 95 pounds of sulfate of ammonia, 125 pounds of nitrate of soda, or the necessary amounts of other nitrogen carriers.*

LIGHT COLORED SOILS				How Apply Fertilizer	CROP	DARK COLORED SOILS				Notes
Sandy Soils		Silt Loams, Clay Loams, and Clays				Silt Loams, Clay Loams, and Clays		Mucks and Peats		
Manured or Clovered	*Neither*	*Manured or Clovered*	*Neither*			*Manured or Clovered*	*Neither*	*Manured or Clovered*	*Neither*	
0–14–6 125–175 150–200	2–12–6 150–200 175–225	0–14–6 125–175 150–200	2–12–6 125–175 150–200	In hill On drilled corn	CORN	0–14–6 100–150 125–175	0–14–6 100–150 125–175	0–12–12 100–150 125–175	0–10–20 100–150 125–175	With improved fertilizer depositors use the higher rates shown. (See pp. 6 and 7.)
6–8–6 500–1000	6–8–6 1000–1500	6–8–6 500–1000	6–8–6 1000–1500	In row	EARLY POTATOES	6–8–6 500–1000	6–8–6 1000–1500	0–10–20 500–1000	0–10–20 1000–1500	
4–8–8 (2–8–10) 500–1000	4–8–8 1000–1500	4–8–8 (2–12–6) 500–1000	4–8–8 1000–1500	In row	LATE POTATOES	4–8–8 (2–12–6) 500–1000	4–8–8 1000–1500	0–10–20 500–1000	0–10–20 1000–1500	Use analyses in parentheses when planting is May 15 or later
2–8–10 (2–12–6) 500–600 15 lbs. nitrogen	3–9–18 500–600 20 lbs. nitrogen	2–12–6 500–600 15 lbs. nitrogen	4–10–6 500–600 25 lbs. nitrogen	In row Side dress	TOBACCO	2–12–6 300–400	2–8–10 (2–12–6) 400–500			Use analyses in parentheses if preferred analysis is not available. Use heavier rates indicated for white burley. Apply nitrogen when plants have spread of 6 to 8 inches.
				In row Side dress	SUGAR BEETS	2–12–6 100–200	4–10–6 200–300 15 to 25 lbs. nitrogen		3–9–18 (0–8–24) 150–250	Nitrogen to be applied as a side-dressing at blocking time. Use analysis in parentheses on high-lime mucks.
None	0–14–6 175–225	None	0–14–6 150–200	Drilled with seed	OATS, RYE OR BARLEY Not seeded to meadow	None	None	None	None	
0–14–6 200–300	2–12–6 (0–14–6) 250–300	0–20–0 200–300	2–14–4 (0–14–6) 250–350	Drilled with seed	WHEAT not seeded to meadow, or ANY SMALL GRAIN seeded to 1-yr. meadow	0–20–0 150–200	0–14–6 200–300	0–14–6 150–200	0–12–12 200–300	When wheat is the companion crop or alfalfa is seeded use heavier rates shown. Use analyses in parentheses on the more productive light colored soils. For wheat apply 15 to 25 lbs. nitrogen April 1 to 15 except under conditions specified on page 8.*
0–14–6 300–350	2–12–6 (0–14–6) 300–400	0–20–0 250–350	2–14–4 (0–14–6) 300–400	Drilled with seed	SMALL GRAIN seeded to alfalfa or other meadow to be cut 2 years or more	0–20–0 200–250	0–14–6 250–350	0–14–6 200–250	0–12–12 250–350	
None	0–14–6 125–175	None	0–14–6 100–150	Drilled solid	SOYBEANS	None	None	None	None	Fertilizer should be drilled in ahead of seeding soybeans.
0–20–0 200–300	0–12–12 250–350	0–20–0 200–300	0–14–6 250–350	Top dress	ALFALFA Established stand	0–20–0 150–200	0–14–6 200–300		0–12–12 150–250	Apply in early spring of the third year after seeding and every second year thereafter. Preferably incorporated in soil with disk drill or spring tooth harrow.
None	10–6–4 200–400	None	10–6–4 200–400	Top dress	TIMOTHY Established stand	None	None	None	None	Apply March 15 to April 1 of third hay year and annually thereafter. Preferably incorporated in soil with disk drill.
0–20–0 200–300	0–14–6 300–400	0–20–0 200–300	0–14–6 300–400	Top dress	PERMANENT PASTURE Entire area	0–20–0 150–250	0–14–6 250–350			Every third or fourth year.
None	20–40 lbs. nitrogen	None	20–40 lbs. nitrogen	Top dress	On fenced area for early grazing	None	15 to 30 lbs. nitrogen			Apply March 1 to April 1. Repeat about September 1 for fall pasture if needed. (Supplementary crops recommended for midsummer grazing.)*
4–12–4 400–500	6–8–6 500–600	4–16–4 400–500	6–8–6 500–600	Broadcast	LAWNS AND FAIRWAYS New seedings	4–16–4 400–500	4–16–4 500–600			Supplementary treatment of 500–1000 lb. 0–20–0 incorporated in upper 3 to 4 inches of soil during preparation is recommended. 100 lbs. per acre equivalent to 2.3 lbs. per 1000 sq. ft.
10–6–4 in three applications, spring, early summer and fall, 100 to 150 lbs. each time, or 400–600 lbs. cottonseed meal, soybean meal or milorganite in May.				Top dress	LAWNS AND FAIRWAYS Established	10–6–4 in three applications, spring, early summer and fall, 75 to 125 lbs. each time, or 300–500 lbs. cottonseed meal, soybean meal, or milorganite in May.				If organics are used on thin stands of turf in the spring, an early fall application of 300–400 lbs. of 4–16–4 is desirable.

* Granular cyanamid may be used for spring top-dressings on wheat, timothy or bluegrass but should be applied two to three weeks earlier than recommended for other carriers. 20 pounds nitrogen is carried by 90 pounds cyanamid.

USE OF FERTILIZERS AND LIME

METHOD OF FERTILIZER APPLICATION

COTTON: Fertilizers when applied simultaneously with planting of the seed should be placed in narrow bands approximately 2½ inches to one or both sides of the seed row and 1½ to 2 inches below the level of the seed.

CORN: When corn is check-planted, the fertilizer should be dropped at the hill and not drilled. Hill applications are best placed in bands 6 to 8 inches long on each side of the seed and separated from it by ½ to 1 inch of fertilizer-free soil and in a depth zone from 1 inch below to slightly above the seed level. Narrow bands, 1 inch or less in width, are satisfactory for quantities up to 200 pounds per acre. For heavier rates the width of band or the lateral separation of seed and fertilizer should be increased.

For drilled corn the fertilizer should be drilled uniformly in continuous bands in the same relative position as suggested for hill applications. Placement close to the seed is less damaging with heavy applications by the drilling method than with hill application.

TOBACCO: Fertilizer should be applied in bands about 3 inches to each side of the row at a depth of one inch below the root crown of the plant. In cases where the ordinary simple distributors are employed in existing practices, precaution should be exercised to avoid too great a concentration of the fertilizer immediately under or around the seedling roots.

POTATOES: Fertilizer should be applied in bands on each side of the seed piece with two inches of fertilizer-free soil interposed. The fertilizer bands should be on a level with or slightly below the seed piece. On sloping land, in order to avoid fertilizer shifting too close to the seed, it is recommended that the depth of fertilizer placement be about an inch below the seed level.

Applying the fertilizer at time of planting through the fertilizer ttachment of the grain drill, which places the fertilizer close to and in partial contact with the seed, has been found superior to separate application, either broadcast or drilled

National Joint Committee on Fertilizer Application

COMMERCIAL FERTILIZER INGREDIENTS

Material	Composition, Per Cent			Degree of availability	Source	Remarks
	Nitrogen	Available Phos. acid	Potash			
Nitrate of soda....	15.5-16	.....	.....	High	Chile and synthetic	
Sul. of ammonia...	20–21	.....	.....	High	By-product of coke ovens and synthetic	Leaves acid residue corrected by equal weight of limestone.
Cyanamid..	22	.....	.....	High	Synthetic	About equal to limestone in neutralizing power.
Urea..............	46	.....	.....	High	Synthetic	
Animal tankage...	4–8	3–8	.....	Medium	Packing houses	Used as conditioner.
Tobacco stems	1.5–3.5	trace	5–10	Medium	Tobacco residues	Used as conditioner.
Garbage tankage—	2.5–3.5	trace	trace	Very low	Garbage reduction plants	Used as conditioner, availability may be increased by acid treatment.
Superphosphate...	......	16–46	.....	High	Rock phosphate treated with sulfuric acid	Most common source of phos. acid in mixed fertilizer.
Steamed bone meal	1.5	23–26 (total)	.....	High	Packing house	Little used in mixed fertilizers.
Basic slag	......	8–18	.....	High	Smelting of phosphatic iron ores	Lime equivalent to 80 per cent carbonate of lime.
Raw rock phos....	......	25–30 (total)	.....	Low	Mined in Tennessee, Florida and elsewhere	Not used in mixed fertilizers.
Muriate of potash:						Principal source in mixed fertilizers.
Foreign.........	......	.....	50	High	Germany and France	
Domestic........	......	.....	60	High	Calif. and N. Mex.	
Sulfate of potash .	......	.....	48	High	Germany and France	Used in tobacco fertilizers.
Kainit	......	.....	12–16	High	Germany and France	
Manure salts......	......	.....	20–40	High	Germany and France	
Ammo Phos......	16	20	.....	High	Nitrogen synthetic	Affects soil reaction similarly to ammonium sulfate.
	11	48	.....	High		
Nitrophoska......	15	30	15	High	Nitrogen synthetic	

Ohio State University

HOME MIXING

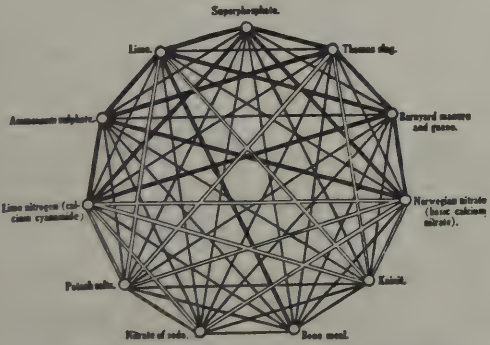

Superphosphate.
Lime.
Thomas slag.
Ammonium sulphate.
Barnyard manure and guano.
Lime nitrogen (calcium cyanamide)
Norwegian nitrate (basic calcium nitrate).
Potash salts.
Kainit.
Nitrate of soda.
Bone meal.

Diagram indicating what fertilizer materials may and may not be safely mixed. The dark lines unite materials which should never be mixed, the double lines those which should be applied immediately after mixing, and the single lines those which may be mixed at any time

United States Department of Agriculture

Limestone

needed, is a highly profitable investment. Lime prepares acid soils for satisfactory crops of clover, alfalfa, or sweet clover.

Growing these crops is profitable because: (1) livestock can be fed more economically when good quality legume hay is available than when other roughages only are fed; (2) the other crops of the rotation can be produced more economically, because liming acid soils increases the yields of all the rotation crops; and (3) when satisfactory legume crops are grown in a good rotation, the productivity of the soil can be maintained economically, although erosion control practices are also necessary on sloping land.

Farmers who realize the value of both liming materials and fertilizers often ask how the money spent for soil improvement should be divided between them when they cannot use both.

The experimental work in Ohio indicates that on acid soils the money available for soil improvement should be spent for liming materials. The use of fertilizers can be omitted for one rotation, if this will permit the liming of the farm. Wheat is the only crop of the rotation that will suffer noticeably because of this program for one season, and wherever possible an application of 200 pounds of fertilizer per acre should be made on wheat when carrying out this program. Yet even this fertilizer application may be omitted if the farm cannot be limed in any other way.

In making these statements we have in mind the future productivity of the farm rather than immediate profits for a year or two.

Relation of Crops to Soil Acidity

Very sensitive to acidity	Will tolerate some acidity, but are usually helped by liming. These crops are not injured by liming unless excessive applications are made, although potato scab may develop when the pH is 5.4 or higher.		Strong acidity favorable
	Will tolerate Slight acidity	Will tolerate Moderate acidity	
Alfalfa	Red clover	Soybean	Blueberry
Sweet clover	Mammoth clover	Vetch	Cranberry
Barley	Alsike clover	Oats	Holly
Sugar beet	White clover	Rye	Rhododendron
Cabbage	Timothy	Buckwheat	Azalea
Cauliflower	Kentucky bluegrass	Millet	
Lettuce	Corn	Sudan grass	
Onion	Wheat	Redtop	
Spinach	Peas	Bent grasses	
Asparagus	Lima, pole and snap beans	Tobacco	
Beets	Carrot	Potato	
Parsnip	Cucumber	Field bean	
Celery	Brussel sprouts	Parsley	
Muskmelon	Kale	Sweet potato	
Rutabaga	Kohlrabi		
	Pumpkin		
	Radish		
	Squash		
	Sweet corn		
	Tomato		
	Turnip		

Ohio State University

HOW TO USE LIMESTONE

First.—Have your soil tested to determine if lime is needed and, if so, how much.

Second.—Use high grade material only.

Third.—Put on lime to benefit red clover, sweet clover and alfalfa, not as a fertilizer for grain crops.

Fourth.—Apply the right amount.

Fifth.—Don't expect lime to be a "cure-all" for soil troubles. It cannot take the place of fertilizer.

UNIVERSITY OF MISSOURI

LEGUME INOCULATION

Inoculated legumes can keep up, or even increase, the fertility of the soil by the use of free nitrogen from the air. Inoculation is not a substitute for lime and it cannot offset the soil's deficiency in any respect except in its supply of nitrogen. Legumes will cross-inoculate within the following groups:

Group 1. Red clover, mammoth clover, alsike clover, and white clover.

Group 2. Alfalfa and the sweet clovers.

Group 3. Cowpea, Japan clover, lima bean, velvet bean.

Group 4. Soybeans.

Group 5. Vetches, garden and sweet pea.

Group 6. Garden and field bean.

UNIVERSITY OF ILLINOIS

IT PAYS TO FERTILIZE

Farmers use fertilizer for one main reason--to make more "clear money" from their crops and livestock. Hundreds of controlled experiments and observations at the college experiment stations and on farms have proved the money value of proper fertilizer use. As a result, the amount of fertilizer used jumped from 1,389,000 tons during 1935-39 to 2,494,000 tons in 1944, with the rate of increase growing larger during 1945-46.

Here is what some of the tests show:

1. ". . .an application of 250 pounds per acre of 8-8-8 fertilizer was plowed under. The corn yielded 54.8 bushels per acre and this had 13 pounds of cobs per 70-pound bushel of corn. On the unfertilized plots, a yield of 44 bushels per acre was obtained and this had 15 pounds of cobs per 70-pound bushel of corn."--University of Missouri.

2. "In the test each ton of alfalfa hay from land treated with manure, limestone and rock phosphate contained 460 pounds of protein whereas each ton of hay from land treated with only manure contained 280 pounds of protein, or a gain of 180 pounds of total protein in each ton of hay from the well-treated lard."--University of Illinois.

HUNGER SIGNS

NITROGEN -- Symptoms resemble firing during dry weather. At first, growth slows down and the stalks may become slender followed by a loss of green color and yellowing. A bright golden-yellow color appears first at the tip of the lower leaves and then works back down the midrib toward the stalk. If the deficiency lasts long enough, the entire plant will die a slow death.

PHOSPHOROUS -- Two of the best signs of phosphorous deficiency are stunted growth and a reddish or purplish color. Occasionally, young plants which have undergone severe root injury will show similar symptoms because the limited root system is not able to reach out in the soil and get the phosphorous needed. Some strains of corn do not show the red color typical of phosphorous hunger. In these, starvation symptoms are very similar to those of nitrogen, although yellowing is not so sharply concentrated in the older, lower leaves.

POTASSIUM -- The most characteristic sign of potash hunger is firing around the edges of the leaves. The edge of the leaf dies quickly after the first yellow discoloration begins to show.

MINOR ELEMENTS -- In specific localities, lack of different minor elements affects plant growth. Most widely noted now (especially in our coastal areas) is boron hunger. The plant stops growing at the top or where the nodes or joints cluster and new branches grow. The upper leaves turn yellow or pink.

Hunger signs are not confined to plants alone. Livestock are victims of numerous "deficiency" diseases which appear in animals raised on feed grown on soils low in certain essential minerals or elements. Minerals and medication for animals may cure the symptoms, but they will not remove the cause. Our selective service records also show how vulnerable the human animal is to hidden hunger.

COMMERCIAL FERTILIZER

Four vital elements are most commonly missing in the soil: nitrogen, phosphorous, potash and calcium. Nitrogen fixing bacteria in the soil under proper conditions can fix all or most of the nitrogen needed in the soil but they cannot supply the other elements. Deep-rooted crops can sometimes bring up minerals from lower soil horizons, but even this source is exhaustible. Commercial fertilizers are used to supplement or replenish these reserves. They are supplied in these forms:

Nitrogen is supplied as commercially produced nitrogen compounds.

Phosphorous is supplied by rock phosphate, superphosphate and triple phosphate.

Potassium is supplied to the soil in the form of potash.

Calcium is usually supplied in the form of crushed limestone or basic slag.

FERTILIZER ANALYSIS

Commercial fertilizers are tagged in order to show the amounts of each compounded element which they contain. These are always shown in the same order: nitrate--phosphate--potash. Thus an 8-8-8 fertilizer contains 8 per cent nitrate, 8 per cent phosphate and 8 per cent potash in immediately available form.

In some areas the only real fertility deficiency is one or more so-called minor elements such as boron, copper, zinc, iron, manganese, chlorine, and sodium. Yet, any one of these may mean the difference between a good or a poor crop no matter how well the crop may be adapted otherwise. An example of this is alfalfa grown on the Atlantic seaboard. The addition of boron to the soil now makes alfalfa growth possible after 100 years of unsuccessful effort. Small amounts of these minor elements are often mixed with commercial fertilizer.

There is danger of too much of some plant food element at one time. This is true even of lime (calcium) which enters into combination with other plant foods (phosphorous, boron, zinc) in such a way as to make them unavailable for use by the plant. Alkali spots should not be limed.

Thus, it is not the "hit-or-miss" system which will realize maximum benefits from fertilizers in terms of yields and money. It pays to watch for hunger signs and have periodic soil analyses made to diagnose soil deficiencies.

FERTILIZER FACTS

HOW TO FIGURE COSTS

"Fertilizer manufacturers publish schedules giving retail prices for many different grades of mixed fertilizers. From these price lists one may calculate the basic cost and the cost per unit of nitrogen, phosphoric acid, and potash in the following manner: Find the difference in price between two grades that differ only in their content of nitrogen and divide this by the difference in percentage of nitrogen. For example, if the price per ton of a 2-8-5 mixture on a delivered credit basis is $26.20 and that of a 4-8-5 mixture is $30.20, the charge for one unit of nitrogen is $\frac{30.20-26.20}{2}$ equals $2.00. In like manner compute the price per unit of P_2O_5 and K_2O always using prices quoted on the same basis. Having found the unit charge for N, P_2O_5, and K_2O, multiply them by the corresponding percentages contained in any mixed fertilizer and subtract the sum from quoted price to find the basic cost of that fertilizer. For instance, suppose the charges for N, P_2O_5, and K_2O are $2, $0.70, and $0.90, respectively, and the cost of 1 ton of 4-8-4 is $28.88. Then the basic cost is:

"Total Cost		$28.88
4 units N at $2	$8.00	
8 units P_2O_5 at $0.70	5.60	
4 units K_2O at $0.90	3.60	
Total cost of plant food		17.20
Basic cost		11.68"1/

Keep in mind when figuring costs per unit for phosphorous that the nitrogen and the potash percentage in the two fertilizers must be the same, and when calculating potassium unit cost, the nitrogen and phosphorous percentage must be the same.

The per ton cost of mixing, handling, tagging, bagging, freighting, trucking, dealers' profits, manufacturers' profits, selling expenses, taxes and other costs are approximately the same for 3-8-3 fertilizer as for 6-16-6. Because of this the total cost per unit of fertilizer goes down as the analysis goes up.

TIME OF APPLICATION

There is no "one" best way to apply fertilizer. Sufficient work has not been done to determine exactly how each type of fertilizer should be applied to various crops and soils. There are some general principles, however, which should be observed.

". . .With regard to the application of fertilizers in general, it has been stated that the most efficient and most effective placement is that which provides for a sufficient supply of soluble nutrients in a well aerated zone of moist soil occupied by actively absorbing plant roots at periods of growth when the demands of the plants for nutrients are most acute."2/

It requires good judgment to fulfill these requirements. The farmer must know:

1. The approximate stage of growth at which the various crops have maximum need for fertilizer.

2. To what soil depth the roots go.

3. Rate of leaching and absorbtion of fertilizer in soil. (This, in turn, depends upon soil type and texture and amount and periods of rainfall. See Digest pp. 609-610.)

4. Chemical changes through which elements of fertilizer go after application, and length of time they are subject to these changes.

METHODS OF APPLICATION

There are many ways of applying fertilizer so that it will fulfill its maximum function for any given crop and soil.

1. Broadcasting. Confined almost entirely to permanent or semi-permanent pastures. Fertilizer may or may not be worked into soil.

2. Side dressing. Fertilizer is laid down in strips on each side of cultivated row after emergence of plants, and is incorporated into the soil by later cultivations.

Side dressing is usually confined to quick-acting nitrogen applications which meet heavy nitrogen demands during maximum growth period of inter-tilled crops.

3. Drilling. Placement of fertilizer with seed at proper depth in soil for sprouting. The accepted method for small grains and grasses.

4. Plow-sole placement. Fertilizer placed along plow-sole at time of plowing has shown fine results with deep-rooted crops and corn.

5. Manure-Fertilizer spreading. Fertilizer mixed with manure at time of spreading, chemically augments the manure in such a way as to increase the value of both.

6. Liquid fertilizer distribution. Process still very much in experimental stages. Some authorities believe that most of our fertilizer applications in the future may be in liquid form.

Applications should be heavy for maximum advantage to the crop treated and for residual effect on follow-up crop.

1/ "Soils and Men" Year Book of Agriculture U.S.D.A. - 1938.

2/ Mississippi Farm Research, Feb. 1946.

Good reference "Hunger Signs in Crops" published by the American Society of Agronomy and The National Fertilizer Association. Washington D.C., 1941.

FEED THE SOIL
SO THE SOIL CAN FEED THE CROPS

As the natural fertility of our soils becomes exhausted through years of continuous cropping, the need for soil amendments grows. It will pay to use fertilizer on more farms today than at any time in history. Use these three tests to measure results.

1. Increased net or investment income per acre.
2. Higher productivity level.
3. Few acres to produce equal yield.

No one system of soil treatment will give the best results on all soils. In fact the most effective treatment for a particular farm tends to change, going from a simple to a more complex system. It is necessary to watch carefully for indication of the need for changes in soil treatment.

(The following statements and data are selected from Illinois Experiment Bulletin 516),

INCREASED INCOME "Soil conditions, as is to be expected, caused marked variations in the effects of different treatment systems. There was a strong tendency for the light-colored soils of (Southern Illinois) low productivity to show the largest increases in net income, and for the more productive dark soils to show the smallest increases. The light-colored soils produced, on the average, increases twice as large as those produced on the dark soils. This relationship, however, is not perfect."

INVESTMENT INCOME

Investment income is the net return after deducting the cost of soil treatment, plus the cost of growing, harvesting, and selling. "The more productive soils tend to give the largest investment incomes. Many of the less productive soils that were left untreated failed to yield enough to meet production costs."

Investment Income and Capitalized Earnings Value of Land: From Untreated Land and From Land Receiving the Most Effective Treatment on Selected Experimental Fields

SOIL GROUP AND FIELD	UNTREATED LAND		TREATED LAND		PERCENTAGE INCREASE
	NET ANNUAL INCOME	INVESTMENT VALUE	NET ANNUAL INCOME	INVESTMENT VALUE	
ALEDO FIELD, MERCER COUNTY VERY DARK MODERATELY HEAVY SOILS WITH MODERATELY PERMEABLE SUBSOIL	$20.65	$229	$27.64	$307	34%
LEBANON FIELD, ST. CLAIR COUNTY, MODERATELY DARK SOILS WITH GRAYISH CAST, SLOWLY PERMEABLE	8.68	96	21.67	241	151%
SPARTA FIELD, RANDOLPH COUNTY YELLOWISH-GRAY STONGLY LEACHED SOILS WITH SLOWLY PERMEABLE SUBSOIL. SLICK SPOTS FREQUENT	-3.04	-34	13.80	153	
AVERAGE OF 22 FIELDS	6.60	73	15.80	177	142%

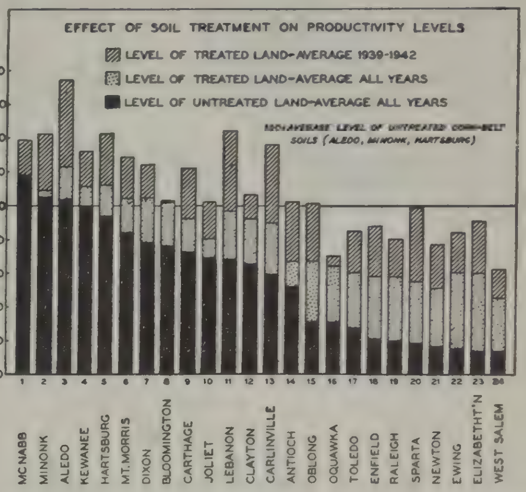
BASED ON INCOME IN THE FOUR YEARS ENDING 1942 AFTER COSTS OF LABOR, SEED SOIL TREATMENT, HARVESTING AND MARKETING HAD BEEN DEDUCTED

"These data take on more meaning when interpreted in terms of land values. Dividing the investment (net) income by .09 (1 per cent for taxes, 5 per cent for interest, and 3 per cent for the retirement of principal and for owner and operator rewards) gives the acre-value of land capable of producing this amount of income. (See table above)

Underlining by Digest Editor

HIGHER PRODUCTIVITY LEVELS

"Another way to appraise the effect of a soil treatment is to note the change it causes in the general productive level of the land.



SUBSTANTIAL CHANGES HAVE BEEN BROUGHT ABOUT BY SOIL TREATMENTS ON MANY ILLINOIS SOIL EXPERIMENT FIELDS. (TREATMENT COSTS WERE DEDUCTED BEFORE CALCULATIONS WERE MADE).

"The different soils reacted quite differently to the different soil treatments. The untreated plots of the more productive dark soils show, for example, an average productivity level of 98 in the long period. Soil treatments raised this level to 110.

"The moderately productive dark soils show, when untreated, a long-time productivity level of 66, 34 points below the base figure. Treatments raised the level 93. . .the productive level of these soils, even under the best treatment, is still 11 points below the level of the treated plots of the dark soils during the same period.

"The low-producing light-colored soils untreated show a long-time level of only 20, 80 points below the base. Soil treatments raised the level to 57. . .Thus altho treatments have not yet raised the yielding capacities of these low-producing soils to the level of the more productive untreated cornbelt soils used as the basis for comparison, they have increased them four to fivefold.

ACRES NEEDED FOR EQUAL YIELD

". . .soil treatments can be used to get more income from the same acreage. This means the same thing, in effect, as expanding a farm without buying more land.

". . .from another angle; soil treatments shrink the acreage needed to produce the same income. Here we see how many acres a farmer could sell, if he wished, without cutting down his income from his farming operations. We also see how many acres he would have to buy under other circumstances. (See graph 'Acres Needed' on next page)

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

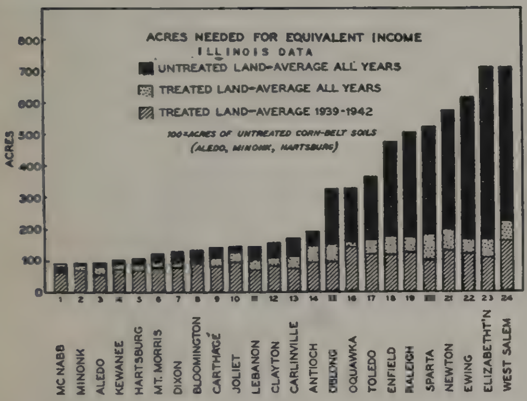
HOW TO USE FERTILIZER

The suggestions made here are. . ."to be considered as supplementary, i.e., adding to, the farm practices now in use and established as sound. Foremost of these sound practices are:

"1. Correct soil acidity by the use of limestone or marl so as to maintain the soil reaction near pH 6.5, which is very slightly on the acid side of neutral.

"2. Use crop rotations that include the legume clovers, lespedeza, or alfalfa every three or four years.

"3. Fertilize the grains in the rotations with adequate amounts of phosphate and potash so as to feed the legumes that are seeded in the grain. For most upland Indiana soils about 400 pounds per acre of 3-12-12 with fall seeded grains and 300 to 400 pounds of 0-12-12 for spring seeded grains will prove very profitable. Where the soils are very deficient in potash it is advisable to broadcast extra potash and plow it under in addition to the mixed fertilizers used in the rotation.



FEWER ACRES ARE NEEDED TO PRODUCE THE SAME INCOME WHEN PROPER SOIL TREATMENTS ARE APPLIED. (TREATMENT COSTS WERE DEDUCTED BEFORE CALCULATIONS WERE MADE).

"4. If corn yields average 70 to 80 bushels per acre with the above practices use about 200 pounds per acre in the drill or 125 pounds per acre in the hill of 3-12-12 or a similar mixture. The small amount of nitrogen in the row starter mixture may not increase the yield unless the soil is fairly fertile. It will give the corn an early growth stimulation.

"5. If the corn yields are down to 50 or 60 bushels per acre an increase of 15 to 20 bushels may be expected under favorable conditions from placing about 40 pounds nitrogen 40 pounds phosphate (P_2O_5) and 40 pounds potash (K_2O) per acre or the equivalent of 400 pounds per acre of 10-10-10 on the plow sole in addition to the row starter fertilization. Variations in this ratio may be desired according to the nitrogen, phosphate and potash levels in the soil. From this practice there is a residual carry-over effect from the fertilizers that will benefit the following crops -- particularly soybeans on limed land.

"6. If livestock is fed, the valuable manure produced must be conserved and used most effectively. A light top-dressing on winter grains seeded to legumes is a sound practice. Manure used on corn land should be plowed under. In this case it may not pay to use the heavy plow-under fertilizer treatments, but only the light row starter applications.

"7. The protection of the soil from erosion is too important to overlook. It is too large a topic to deal with here.

"8. The use of proven and improved seed is imperative.

POOR OR EXHAUSTED SOILS

"Where the corn yields are down to an average of 30 or 40 bushels per acre, the soil is probably very deficient in organic matter and nitrogen, in available phosphate and potash, and is probably in need of lime. To get a quick start on such soils it is necessary to use heavy amounts of fertilizers. Our suggestions are:

"1. With a fertilizer attachment on the breaking plow, place on the plow sole in a band about 80 pounds nitrogen, 80 pounds phosphate (P_2O_5) and 80 pounds potash (K_2O) which is equivalent to 800 pounds per acre of a 10-10-10 fertilizer, and apply in the row a small amount of starter fertilizer as a 3-12-12, 2-12-6 or 2-16-8.

"If moisture, cultural practices, and stand are adequate, a 30 to 50 bushel per acre increase may be expected, although more has been made from this treatment on such soils. If factors other than nitrogen, phosphate, or potash are limiting on such land, of course these increases will not be made. The succeeding crops will benefit from the residual effect of this fertilization.

"2. If straw or carbonaceous organic matter is to be turned under on a soil where the phosphate and potash supplies are known to be good, plow under with the carbonaceous organic matter 300 to 400 pounds per acre of cyanamid or ammonium sulphate. Where the soil is black and potash is known to be very deficient, plow under about 200 pounds of muriate of potash per acre and use the row fertilizer commonly recommended.

"3. Both ammonium sulphate and cyanamid have been used in these tests and both seem to be equally effective as carriers of an ammonium form of nitrogen. The ammonium sulphate increases the soil acidity after prolonged use but this effect can be easily and cheaply corrected with liming. It is not advisable to plow under limestone materials in contact with ammonium sulphate.

"4. In starting with the corn crop on very poor soils, it may prove more economical to obtain a quick restoration of the fertility by investing in adequate fertilizer containing the necessary plant food nutrients and plowing these under on the plow sole for most effectiveness, than to go through the longer and slower soil building process through rotations, with legumes and smaller amounts of fertilizers. The loss in time for the years of low crop production in the long pull of soil building through the rotations may also be expensive, even though not as obvious.

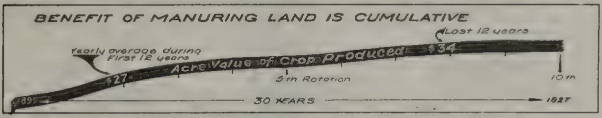
"It is now possible to get big corn crops on poor soils without waiting. After the farmers have done this, they should then switch into good rotational and soil maintenance practices, and be in the farming business to stay."

(Selected from Purdue Extension Bulletin 482. Recommendations are for the state of Indiana and should be used in other areas only after consulting your state authorities. They are presented here as an indication of possible requirements to produce high yields and raise the productivity level of the soil).
Underlining By Digest Editor

HOW TO SAVE AND USE MANURE

Good farmers have known for a long time that commercial fertilizers are not the whole answer to soil fertilizer and some farmers feel that commercial fertilizers "kill the soil". There is a half-truth in this. Commercial fertilizer without proper attention to the return of organic matter to the soil can result in permanent damage. However, rapid soil rebuilding is usually not possible without heavy application of commercial fertilizer.

Under ideal conditions, the return of manure and organic matter to the soil plus the release of minerals within the soil mass is enough to build soil fertility slowly. Note the 30-year record of a standard application of manure on a corn-wheat-clover rotation.

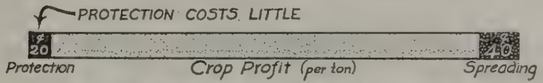


VALUE OF MANURE

Based on the value of the crops produced, a ton of manure has a value of $2.50 to $3.50 (prewar). In terms of September, 1948 prices, a ton of manure is now worth $6.50 to $9.00 per ton. Thus the manure produced by a herd of 20 cows is worth at least $1,560 at todays prices. (The manure produced on any farm can be estimated by using the table-Schedule B on Digest Page 552).

COST OF PROTECTING AND HANDLING

The cost of protecting and handling manure is small compared to the benefits.



$10,000,000 DESTROYED

The money destroyed through careless handling of manure can hardly be estimated. In 1942 South Carolina authorities placed the annual loss in that state at nearly 10 million dollars. At todays prices this is equal to 25 million dollars. What would it be for all of the 48 states?

HOW FERTILITY IS LOST FROM MANURE

LACK OF WATERTIGHT FLOORS AND ENOUGH BEDDING. The liquid part of manure carries about half the total plant food. It usually carries somewhat less than half the nitrogen and considerably more than half the potassium but very little of the phosphorus. The nitrogen and potassium in liquid manure are the most valuable parts of manure.

MANURE LEFT IN LOOSE PILES. When manure is piled loosely, so that the air can circulate through it, nitrogen from both solid and liquid manure is lost into the air and organic matter destroyed by decay. Rotting is especially rapid when these loose piles are left exposed to wind, rain and sun.

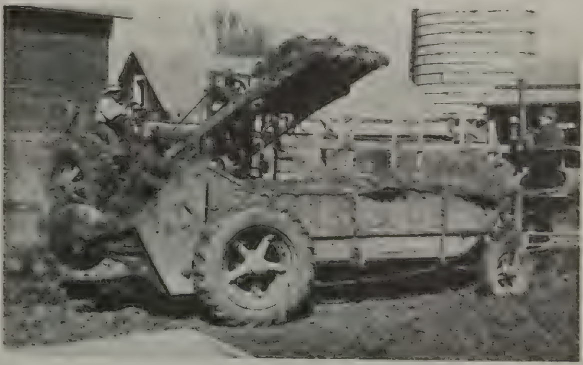
UNPAVED FEEDLOTS. When manure is dropped in muddy feedlots most of it is tramped into the mud and lost. On many farms a large tonnage badly needed on the cropland disappears in the mudhole feedlots each year.

HOW TO REDUCE THE LOSS

USE PLENTY OF BEDDING, TIGHT FLOORS. Both in stalls and in sheds see that the floors are watertight and use enough bedding to absorb all liquid manure. Shredded fodder, the straw of small grains, soybean straw, and the leavings from clover and alfalfa hay are good for this purpose. They not only soak up and save the liquid manure but also add their own fertility to the soil.

HAUL FROM STALLS TO FIELD DAILY IF PRACTICABLE. On many dairy farms the stalls are cleaned daily and the manure hauled directly to the field. It is important to spread the manure daily. If left in piles either outside or in stalls for several days, manure heats, and loses nitrogen into the air.

LEAVE MANURE IN CATTLE SHED. If manure is left under the cattle in sheds until a convenient time to haul it, it will be tramped on and kept moist and well packed. Little nitrogen and organic matter will be lost thru decay. The manure from the stalls also can be added to the shed manure.



A tractor manure loader and paved feedlot save labor and manure. The manure dropped in the cattle shed is stored there until a convenient time to haul and spread it on crop fields or pastures.

STORE MANURE IN A PIT. If there is no cattle shed to store the manure in, and if it is not feasible to haul it directly to the fields, a pit with a watertight floor and sidewalls will soon pay for itself in fertility saved. When stored outside or in pits, manure should be put in deep piles with straight sides in order to hold back decay.

HOW TO SAVE AND USE MANURE

LET THE LIVESTOCK DO THE WORK Animals on pasture spread their own manure with little loss of its fertilizing value. Besides, keeping livestock on good pasture as much of the year as possible saves labor and is better for the stock.

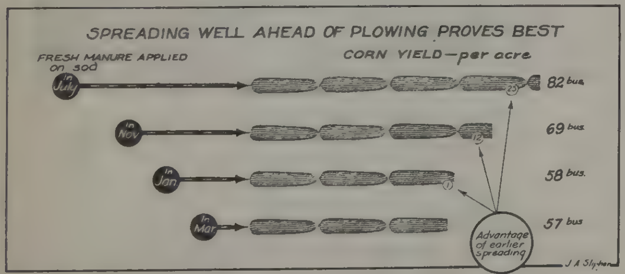
PAVE THE FEEDLOTS A paved feed lot soon pays for itself in the manure it saves. It also pays a profit in feed saved, in faster gains, and in the comfort and health of the cattle.

ADD SUPERPHOSPHATE All manure heats to a greater or lesser degree. This releases nitrogen in the form of ammonia gas. The best way to prevent this loss is by adding superphosphate. In addition, this helps to make manure a well balanced fertilizer. Add 30 pounds of superphosphate per ton of manure. "Hot" or readily fermentable manures, such as horse and sheep manures, need more liberal treatment, about 40 pounds. Allow from one-half to one pound daily for each mature horse, cow, steer, or equivalent.

The phosphate treatment is good only for that manure produced and kept under cover until hauled to the field. With horses the application is best made just before cleaning the stable. Dusting in the gutter of the dairy stable either before or after cleaning is equally satisfactory. Where manure is allowed to accumulate, as in the cattle feeding barn, it will save time to give the phosphate treatment once a week or just before each bedding of the lot. Manure in temporary storage needs superphosphate most, as it will heat quickly when piled up this way.

WHERE TO USE MANURE

ON ROW CROPS -- row crops are heavy users of plant nutrients and water. The minerals contained in manure are readily available to growing crops and one ton increases the water holding capacity of the soil by nearly 3400 gallons. A study in Connecticut reveals that well manured soils retain 55 tons more moisture in the plow layer during a drouth period than did adjoining land, well fertilized but unmanured. Plow the manure under and apply early to get maximum results.

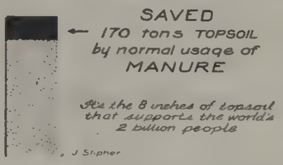


ON SPRING SEEDING - The best means of starting seedings of legumes or grass is a top dressing of manure. The more compact the soil the greater the need.

ON SUMMER SEEDING - Experience and tests of top dressing alfalfa seedings in midseason amply demonstrate its value in bringing stands through in dry seasons. The best procedure is to top dress immediately after broadcasting the seed on cultipacked ground.

ON WEAK SEEDINGS -- A stunted seeding may gain much from an application of manure after grain harvest and before the onset of winter.

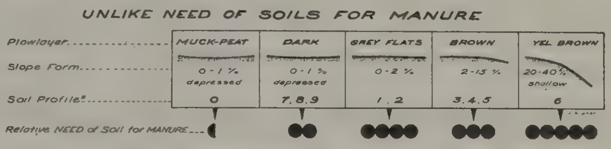
ON ERODING SOIL - Manure and straw placed on the ground slow down the run off of surface water. This means less erosion -- less washing away of valuable top soil.


SAVED
170 tons TOPSOIL by normal usage of MANURE
It's the 8 inches of topsoil that supports the world's 2 billion people
J Slipher

Consistent usage of manure for 42 years in a balanced rotation at the Ohio Station reduced erosion 17 per cent amounting to 170 tons an acre. **ON PERMANENT GRASSLAND** -- Diverting manure from cropland to permanent grassland is normally inadvisable. Put the manure back on the cropland where it came from.

SOIL NEEDS

All soils benefit from manure but some more than others.



* Being the third digit in the standard number designating the sort of soil and now appearing on individual soil maps of farms in Soil Consevation Districts in Ohio.

Shallow soils, characteristic of sloping land, need lots of manure. Soils on ashy gray flats also show a very big response. Even dark colored soils will normally respond to the use of manure.

RATE OF APPLICATION

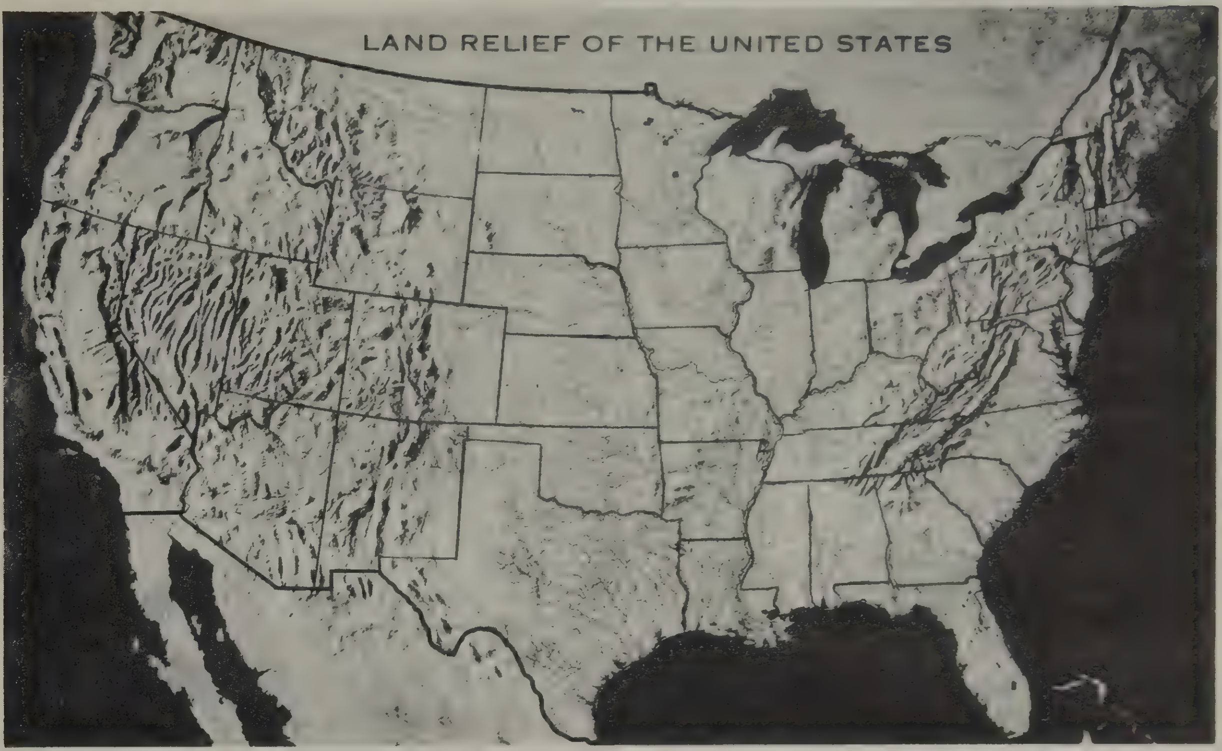
Light applications show bigger returns per ton of manure spread than heavy applications. Other things being equal, two light applications of manure in a rotation show better results than spreading it all at one time. Only finely divided manure can deliver its full strength.

HOW TO APPLY MANURE

Plow under, or disk in after plowing for good corn growth on silt loams and heavier soil types. On sand it is best to turn manure under. Top-dressing corn is least effective. Disking a light treatment into the top 4 inches of soil being prepared for wheat places the manure in the best position. Top-dressing is satisfactory on wheat where winter protection is being sought, and must be used on grass.

Source: Based on University of Illinois Extension Circular 595 and Ohio State University Extension Bulletin 262, with selected quotations and illustrations from both.

LAND RELIEF



The accompanying photograph of a relief model of the United States shows in a generalized way the most pronounced topographic features. State lines have been lightly imposed on the picture.

The mountain areas are clearly shown but of course the photograph does not bring out the difference in altitude of the more level areas.

The altitude increases rapidly going west from the Mississippi River. The high plains and table-lands just east of the Rocky Mountains have elevations running well over 4000 feet. As a result of the high altitude, this general region has a much cooler climate, as the temperature maps show.

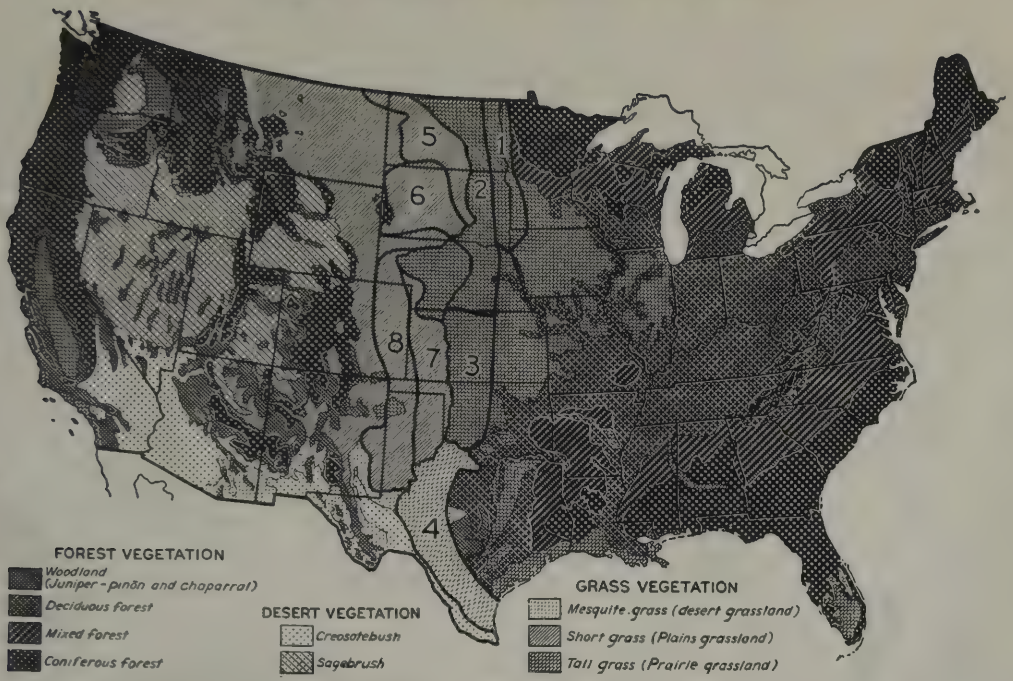
By contrast, the smooth coastal plains along the Gulf of Mexico and the Atlantic Ocean have a very low altitude.

The generally level to rolling topography of the central part of the United States is broken only by the ancient Ozark uplift. This vast prairie and plains country is dissected with an intricate network of creeks and rivers. These are responsible for erosion on the drained areas and for floods on the lower areas traversed before reaching the sea.

Physical features such as land relief have been fundamental in determining the geography of American agriculture.

Map from U.S.D.A. Bureau of Agricultural Economics

NATURAL VEGETATION

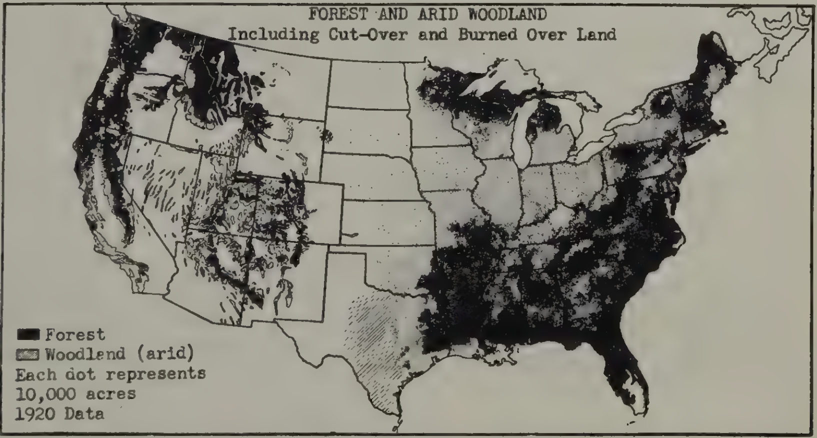

1
2
3
4
5
6
7
8
FOREST VEGETATION
Woodland (Juniper - piñon and chaparral)
Deciduous forest
Mixed forest
Coniferous forest
DESERT VEGETATION
Creosotebush
Sagebrush
GRASS VEGETATION
Mesquite grass (desert grassland)
Short grass (Plains grassland)
Tall grass (Prairie grassland)

Types of native vegetation of the United States. In addition to the legend on the map the following plant communities are designated by number: (1) Porcupine grass, junegrass, and slender wheatgrass; (2) needle-and-thread, junegrass, and slender wheatgrass; (3) little bluejoint (bunchgrass); (4) desert grass savanna; (5) blue grama, junegrass, and needle-and-thread; (6) blue grama, buffalo grass, and bluestem (western wheatgrass); (7) blue grama, buffalo grass, and red three-awn (wire grass); (8) blue grama and buffalo grass.

Natural vegetation has been an important agent in soil-forming processes, helping to determine such characteristics as native fertility and durability.

The natural vegetation of the United States and its subsequent agricultural use in 1934 were:

Natural Vegetation	Total Acres	
Forest	800,000,000	350,000,000 acres cleared for farm use. Less than 200,000,000 acres used for crops.
Grassland	700,000,000	250,000,000 acres plowed and used for crops; remainder used for pasture.
Desert	400,000,000	13,000,000 acres put to crop use by irrigation. Most of balance used for grazing.


FOREST AND ARID WOODLAND
Including Cut-Over and Burned Over Land

The small map shows the approximate location of the present forest and arid woodland. About one-half the forest acreage is in the South, and about one-fourth is in the West. About 50,000,000 acres once cleared of forest have reverted to timber or brush.

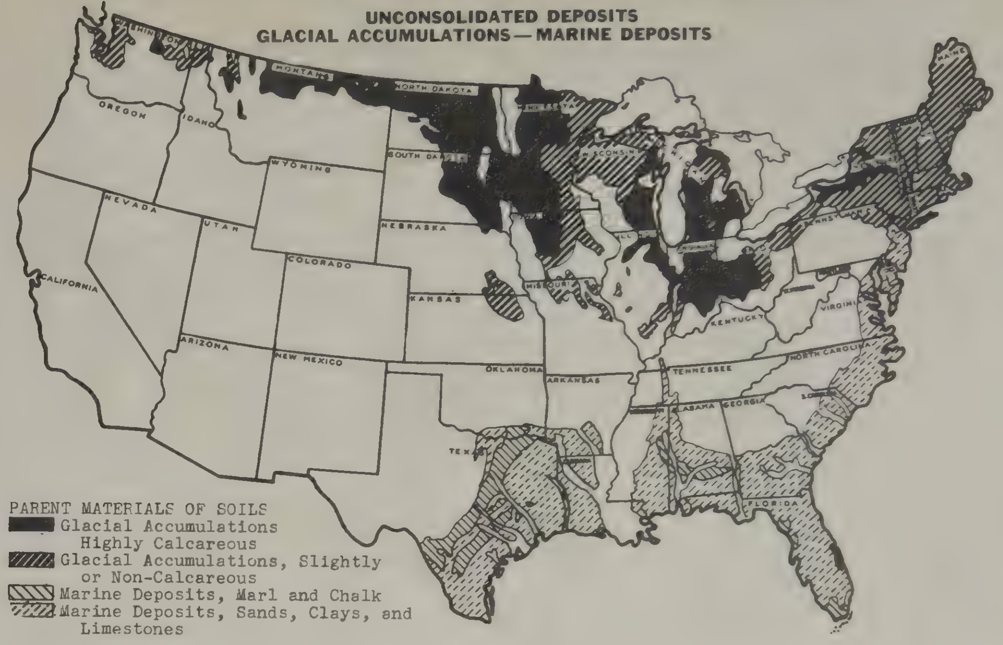
Timber normally does not build a fertile soil. It is a heavy feeder on soil elements, and although it accumulates some available plant food in the surface through rotting of leaves and decay of fallen limbs and trees, the total of such accumulations is not great.

Despite the present greater value of prairie soils, they were originally settled after the timber soils, and for a long time were considered less desirable. This was because the timber soils were usually nearer water supplies and nearer the rivers, the routes of travel over which the settlers came. With the lighter implements then in use, the timber soils were easier to work than the tough prairie sod. Thus the timber soils, in addition to having possessed less native fertility than the prairies, have usually been farmed longer and a greater proportion of fertility has been removed.

Natural vegetation alone cannot safely be used as an indicator of soil desirability. A knowledge of it is useful, however, in understanding some important differences in soils.

Based on Data of Forest Service and U.S.D.A.

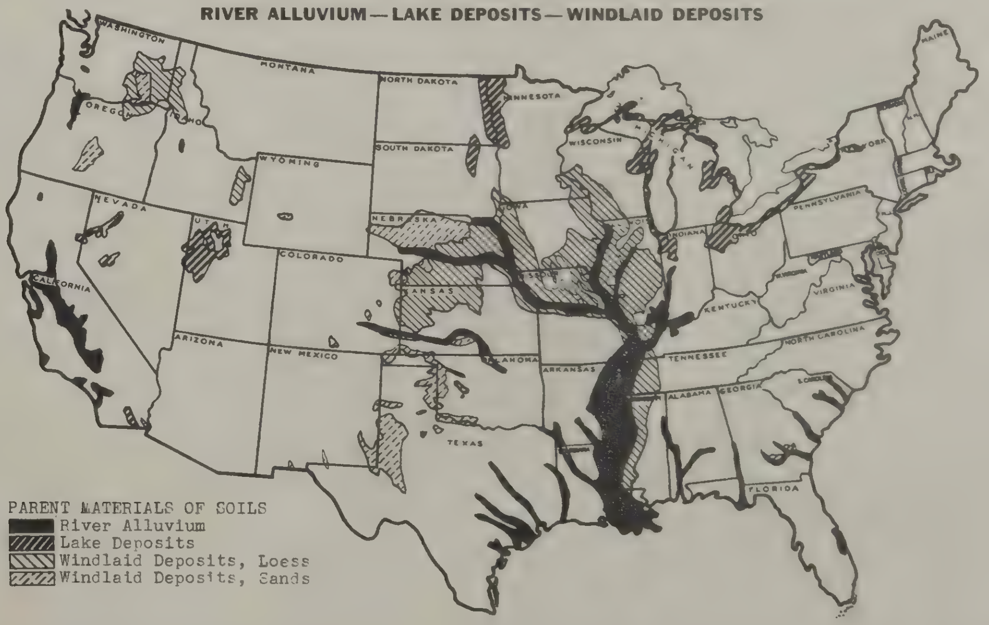
PARENT MATERIALS OF SOILS


UNCONSOLIDATED DEPOSITS
GLACIAL ACCUMULATIONS — MARINE DEPOSITS

Glacial deposits were transported to their present positions by the great ice sheets. One of the chief basic differences in the various deposits is in the lime content. Most of the Late Wisconsin glacial deposits were high in lime.

Great variations occur in the soils which developed from similar glacial deposits primarily because of environmental differences in natural vegetation and climate, particularly variation in rainfall.

In various geological ages the sea has alternately encroached upon and receded from what is now land. Some deposits in these seas solidified into rock such as the great limestone layers of the Mississippi Valley. Other deposits remained as unconsolidated materials, such as marl and chalk, from which the Black Belt of Texas developed. The extensive coastal plains along the Atlantic and the Gulf are largely sands, clays, and limestone deposited in the ocean when this area was inundated.


RIVER ALLUVIUM — LAKE DEPOSITS — WINDLAID DEPOSITS

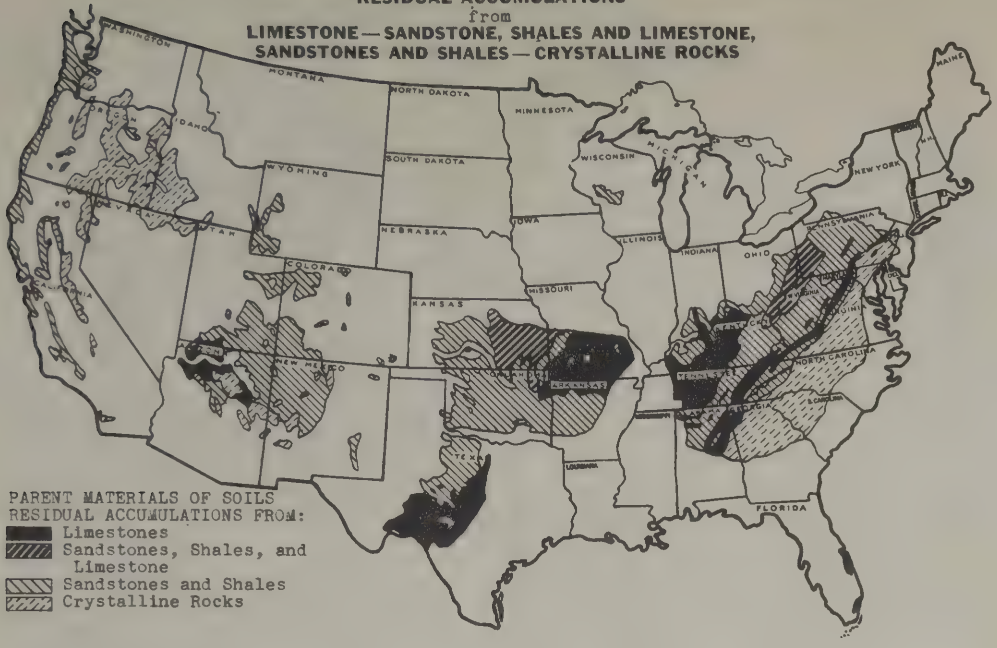
These are transported parent materials, rivers, lake water, and wind being the carrying agencies. Most of the resulting soils except the sands, which frequently are dune-like, tend to be fertile and productive, if drainage and other conditions are favorable.

Most of the northern loess deposits rest on glacial drift. This is a favorable feature.

Based on Data of U.S.D.A.

PARENT MATERIALS OF SOILS

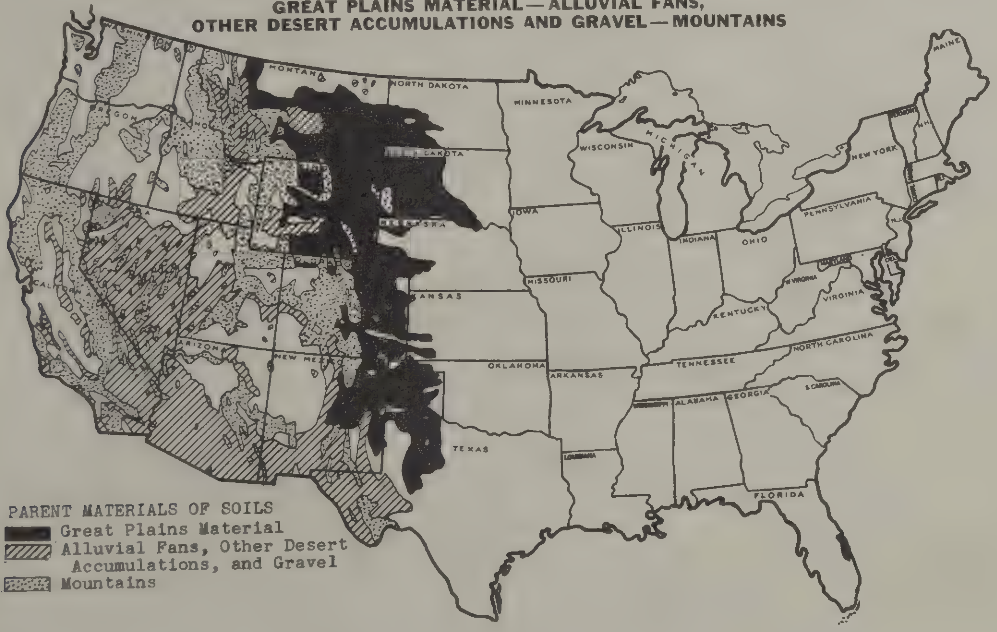
RESIDUAL ACCUMULATIONS
from
LIMESTONE — SANDSTONE, SHALES AND LIMESTONE,
SANDSTONES AND SHALES — CRYSTALLINE ROCKS



Parent rock is a passive element rather than an active force in soil formation but is responsible for a great variety of soils. Parent materials of soils develop from rock by the various processes of weathering. When this material remains where formed, it is referred to as residual in contrast to other soil parent material that has been transported by such agencies as ice, water, and wind.

High clay content in soils tends to result from limestones, shales, and crystalline rocks. Sandstone contributes sand and other ingredients to soils.

GREAT PLAINS MATERIAL — ALLUVIAL FANS, OTHER DESERT ACCUMULATIONS AND GRAVEL — MOUNTAINS



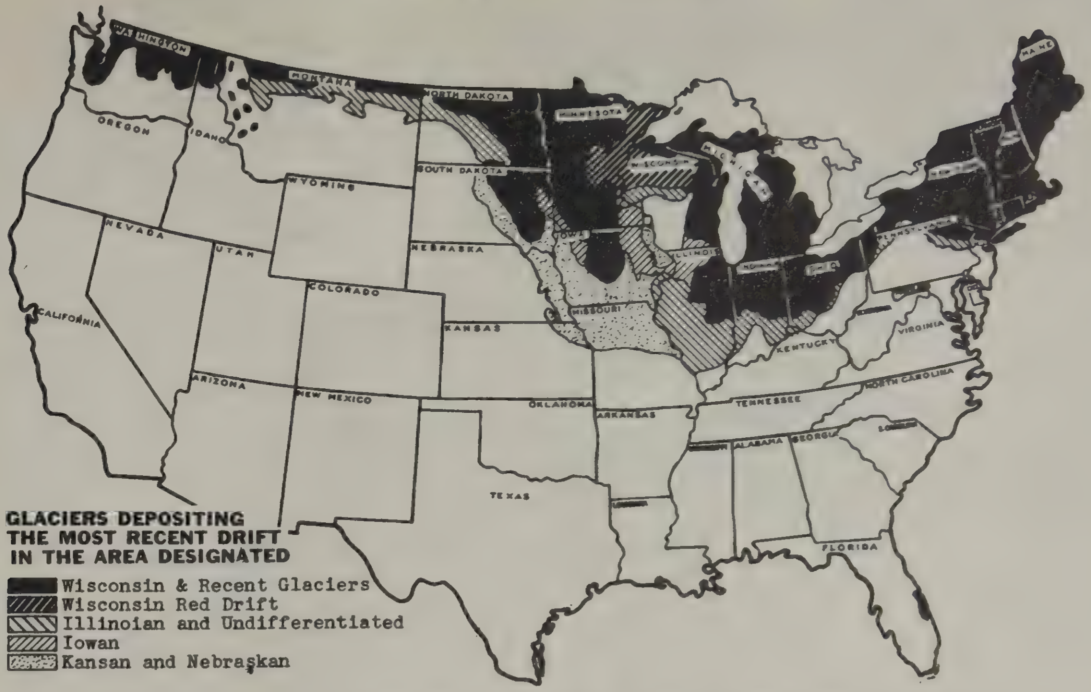
The soils of the parent materials on this map are comparatively young, as most of them are associated with the Rocky Mountains which, in terms of geologic time, are considered a new mountain range.

Most of the Great Plains material was originally laid down as broad alluvial fans with some volcanic deposits and various other formations. The other parent material area is a varied accumulation including alluvial fans formed from the wash off of the mountains.

These great ancient alluvial fans were spread out at the base of the mountains when extremely heavy rainfall prevailed in this area. The climate and land at that time were a decided contrast to the present arid and desert conditions.

Based on Data of U.S.D.A.

GLACIAL DRIFT



The surface geology of a large portion of some of the northern states, and particularly the area throughout the Corn Belt, is the result of repeated glaciation. The five glaciers which invaded the central part of the United States are known by state names, and in order of age were as follows:

1. Nebraskan
2. Kansan
3. Illinoian - Estimated age 140,000 years
4. Iowan
5. Wisconsin - Estimated age 20,000 years

The age of some adjoining unglaciated areas is estimated to be 1,000,000 years or more. Therefore geologically the Wisconsin glaciation was of comparatively recent date.

In many cases the deposits of the first glaciers have been mixed with the material of later glaciers or have been covered by them.

Between the successive ice invasions were long intervals with a mild climate, much like the present, during which the ice melted away and the land became covered with vegetation. In most places the slowly moving ice of the subsequent glaciers picked up and carried away the surface soil and parts of the subsoil that developed during these intervals of mild climate. This material no doubt contributed to the fertility of the deposits of the Wisconsin glacier, which left what are now the most productive soil areas of this and other states.

The last ice sheet, the Wisconsin, did a remarkable amount of shifting. An early lobe extended into the northern part of Wisconsin and Minnesota, apparently coming in from a center to the east of Hudson Bay. It carried red drift material with comparatively few limestone fragments. During the latter part of the Wisconsin glaciation, the ice moved in from the north and northwest, carrying what is commonly referred to as Late Wisconsin, Keewatin, or Young Gray Drift.

The flow of the ice sheets was not continuous during any glacial period. This explains the manner in which much of the drift was deposited. When the front of the ice sheet melted back more rapidly than it advanced, the glacial drift was deposited in large, smooth areas of heavy soils known as "till plains".

Where the ice sheet advanced about as rapidly as it melted, or where it alternately retreated a short distance and then re-advanced, the deposit of glacial drift became deep and rough. When the ice finally retreated, there was left what is known as "terminal morains".

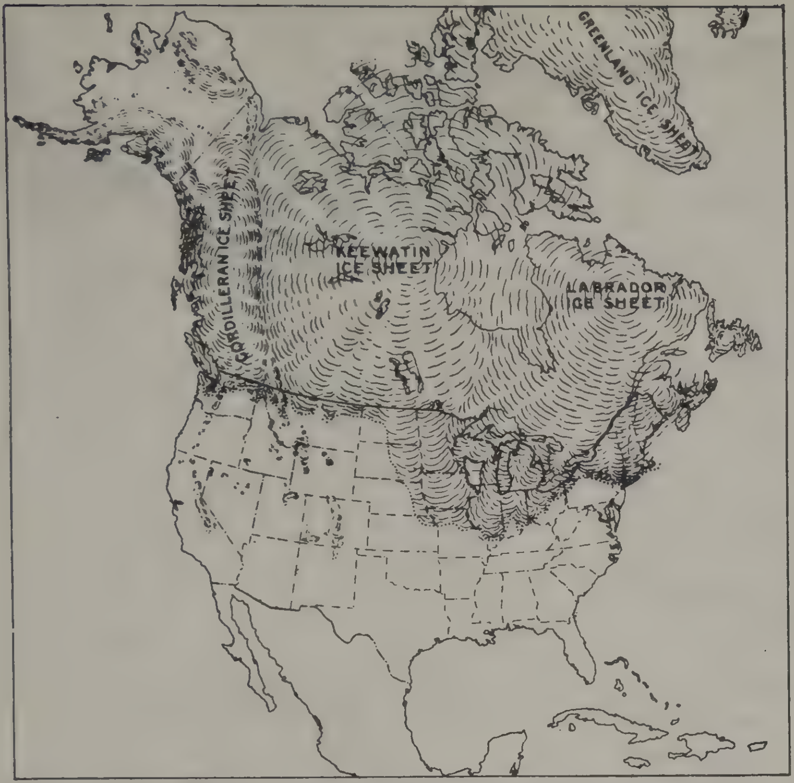
The water rushing from the melting ice front carried great quantities of fine material known as "rock flour". It also carried sand and rolled along gravel, pebbles, and cobblestones. When this water slackened in velocity, the sand, gravel, and stones were deposited to form "outwash plains".

In the periods intervening between the various glaciers there were periods of low rainfall in at least some areas in which wind erosion was very active. The wind carried rock flour, or loess deposits, which were spread over extensive areas of the Midwest as a mantle of soil varying in thickness from a few inches to many feet.

The glaciers and the accompanying loessial deposits are primarily responsible for the desirable midwestern soils of the United States which produce most of the corn, wheat, and oats of the nation.

Data from Various Geological Surveys and Authorities

GLACIAL ICE SHEETS



THE MAXIMUM EXTENSION OF THE GREAT ICE SHEETS AND THE CENTERS OF ICE ACCUMULATION

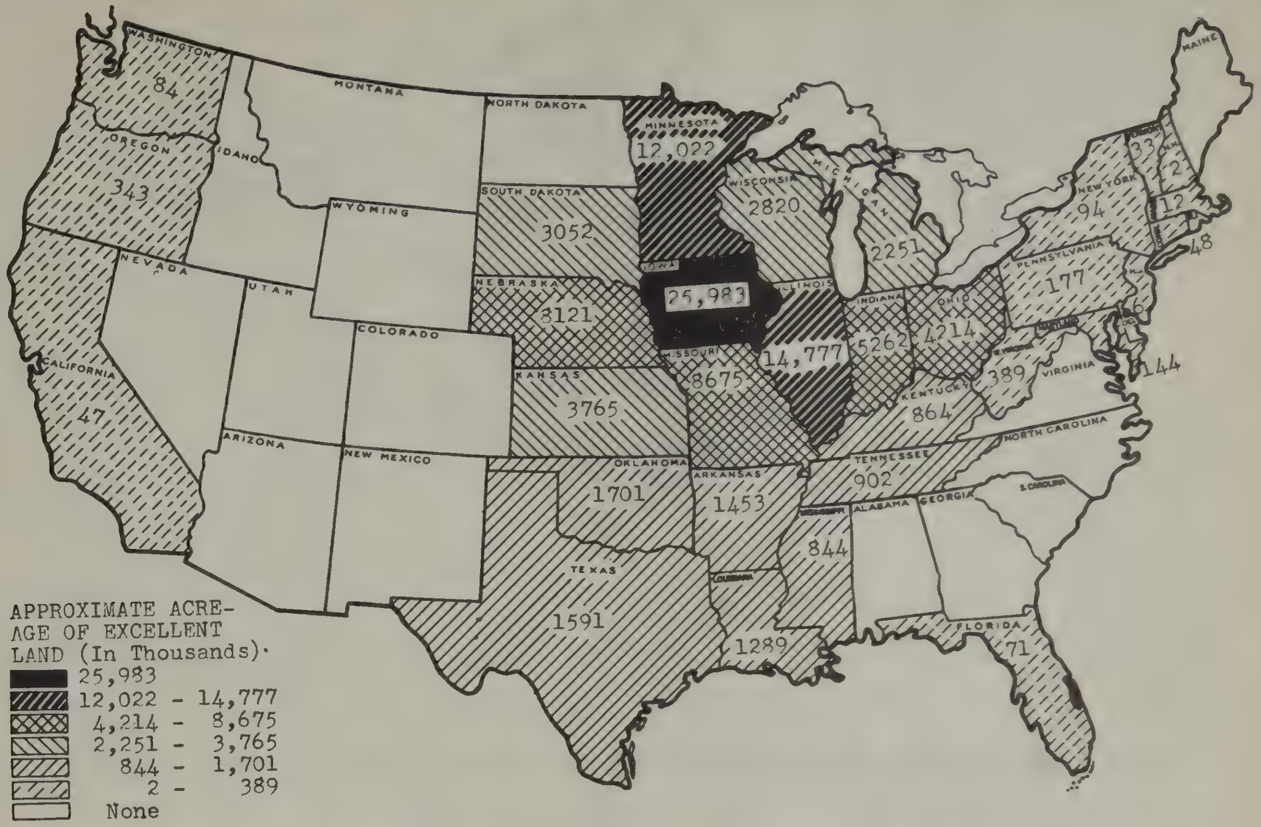
The glaciers were formed in what is called the Great Ice Age, or the glacial period. During this period the heat in summer was not sufficient to melt all the snow that fell in the preceding winter, so snow accumulated from year to year, especially in central and eastern Canada, and gradually became compacted to ice. In time the ice became so thick that, spreading under its own weight, it formed vast slowly moving sheets or glaciers. The accompanying sketch map shows the area covered by the great ice sheets at the time of their maximum extension.

Five times these glaciers formed in Canada, spread southward into the Northern States, and finally melted away. These glaciers carried and dragged along much of the loose stone and clay which lay in their paths and even scoured and wore away solid ledges of rock. When the ice melted this material was left spread over the land as glacial drift.

At its greatest extent the ice covered almost all of Minnesota and Iowa, as well as parts of adjoining States on the west, south, and east, reaching and in places crossing Missouri and Mississippi rivers. The several glaciers and the deposits of drift which they made are known to geologists by the names of the States in which the ice reached its greatest extent or in which the drift features are particularly well displayed.

From U. S. Geological Survey

ACREAGE OF EXCELLENT LAND



The figure in each state shows, in thousands of acres, the approximate acreage of excellent land for the production of grains, grasses, and legumes. These figures exclude irrigated and drained land and that improved by fertilization.

Only 5.3 per cent of all land in the United States, or a total of 101,038,000 acres, is classed as excellent land as defined above.

This map emphasizes the extent to which the Corn Belt has been naturally endowed with fertile, productive soils. Three-fourths, or about 75,000,000 acres, of the total acreage of excellent land is located in the Corn Belt. More than one-fourth of the total acreage is in Iowa, and the three states of Iowa, Illinois, and Minnesota contain more than one-half the total.

By agricultural regions, the distribution of acreages is approximately as follows:

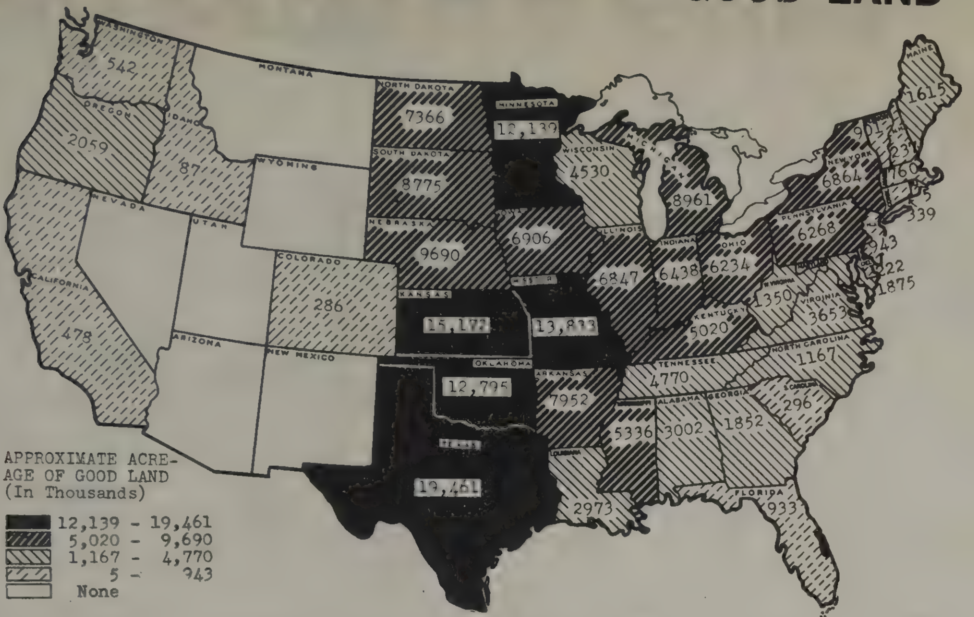
Region	Acres
Corn Belt	75,000,000
Spring Wheat Belt	5,000,000
Winter Wheat Belt	5,000,000
Dairy Belt	5,000,000
Mississippi River and other river bottoms primarily of the Central Cotton Belt	4,000,000

The remaining acreage is found primarily in the blue grass districts of Kentucky, Tennessee, and West Virginia; the black prairies of Texas and Oklahoma; and small scattered areas in the Pacific Coast states.

Although irrigation, drainage, fertilization, and other expensive soil improvement processes are raising limited areas to a state of productivity that rivals these general regions of excellent land, it is probable that the principal acreages of high producing farm land will continue to center in the above designated states for many years to come if not permanently.

Preliminary Estimate by Bureau of Chemistry and Soils, U.S.D.A.

APPROXIMATE ACREAGE OF GOOD LAND



The figure in each state shows, in thousands of acres, the approximate acreage of good land for the production of grains, grasses, and legumes. These figures exclude irrigated and drained land and that improved by fertilization.

Approximately 11.1 per cent of all land in the United States, or a total of 210,935,000 acres, is classed as good land.

Approximately one-third, or 70,000,000 acres, of the land rated as good is located in the Great Plains region extending from Texas to North Dakota.

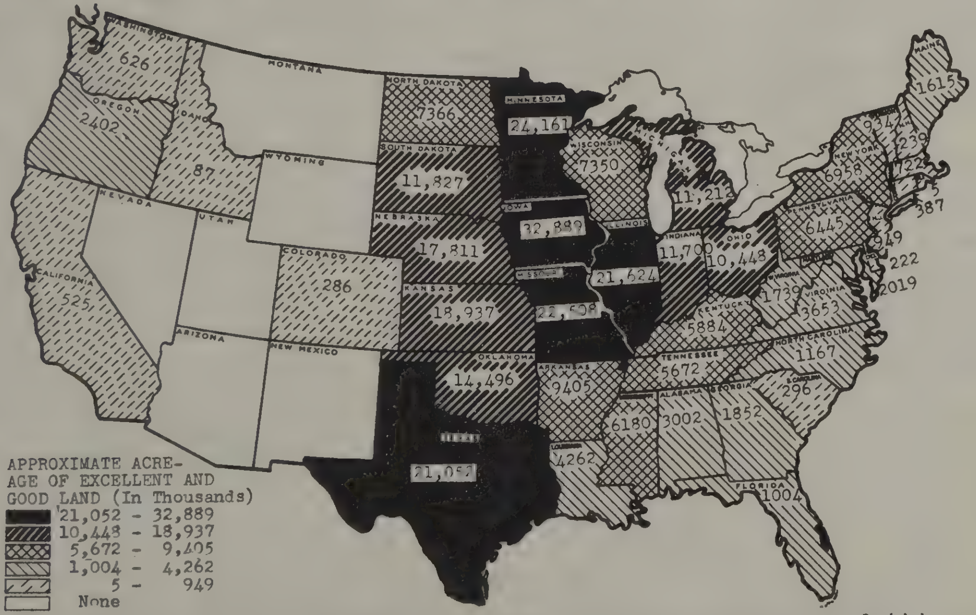
About one-fourth is in the dairy states extending from Minnesota to Maine and Maryland.

Approximately one-fifth is in the five corn belt states of Missouri, Iowa, Illinois, Indiana, and Ohio, ranking in the order named.

About one-fifth is in the southern states other than Texas and Oklahoma.

Less than 2 per cent is in the eleven far western states, with most of this acreage in the Pacific region. The small extent of good land in the West is due primarily to a deficiency of rainfall rather than to undesirable and infertile soils.

APPROXIMATE ACREAGE OF EXCELLENT AND GOOD LAND



The above map shows, by states, the combined acreage of excellent and good land, separate maps of which appear immediately preceding this one. This further lends emphasis to the dominance of the corn belt and midwestern states from the standpoint of the natural heritage of excellent and good land.

One-tenth of the total acreage is in Iowa.

Almost one-third of the total is in the four states of Iowa, Minnesota, Missouri, and Illinois, in the order named. (Missouri ranks below both Illinois and Minnesota in acreage of excellent land but has a larger acreage of land rated good than either of the other states.)

A striking feature of this map is the extent to which the most productive land is found in the humid and subhumid portions of the United States, including a part of the Great Plains region and all the states to the east.

Final conclusions as to the agricultural possibilities of individual states and individual areas cannot be drawn from these broad maps, but they help to visualize the general regions within which the more productive fertile land

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Preliminary Estimate by Bureau of Chemistry and Soils, U.S.D.A.

(Printed in U. S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

GLOSSARY OF SOIL TERMS

Acid Soil - A soil giving an acid reaction throughout most or all of the portion occupied by roots.

Adobe - A heavy textured soil high in clay.

Aeolian - Soil material transported and deposited by the wind.

Aggregate (of soil) - A single mass or cluster of soil consisting of many soil particles held together, such as a clod, prism, crumb, or granule.

Alkali - A concentration of soluble salts to such an extent as to be detrimental to plant growth. They are sometimes of considerable extent in low lying or undrained land, particularly in irrigated regions. The presence of alkali is indicated by a white or brown incrustation. Land where alkali is suspected should be tested.

Alkali Soil - A soil containing alkali salts, usually sodium carbonate. The term is frequently used loosely to include both alkali soil and saline soil as here defined. Where applied to saline soil, the expression "white alkali" is used in some localities, and the expression "black alkali" is used for alkali soil as here defined, with or without the presence of neutral salts.

Alkaline Soil - Any soil that is alkaline in reaction.

Alluvial - Soil material deposited by flowing water above low tide level.

Alluvial Soils - Azonal group of soils, developed from transported and relatively recently deposited material (alluvium) characterized by a weak modification(or none) of the original material by soil-forming processes.

Alluvium - Fine material, such as sand, mud, or other sediments deposited on land by streams.

Association, Soil - A group of soils, with or without common characteristics, geographically associated in an individual pattern.

Azonal Soils - Any group of soils without well-developed profile characteristics, owing to their youth or conditions of parent material or relief, that prevent the development of normal soil-profile characteristics.

Bedrock - The solid rock underlying soils and other superficial formations.

Bog Soils - An intrazonal group of soils with a muck or peaty surface soil underlain by peat, developed under swamp or marsh types of vegetation, mostly in a humid or subhumid climate.

Black Waxy (Texas) - A term applied to a heavy black clay soil which is extremely sticky when wet. The Houston Black Clay is often referred to as "black waxy land".

Calcareous Soil - Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly to the naked eye when treated with hydrochloric acid. Soil alkaline in reaction, owing to the presence of free calcium carbonate.

Caliche - A more or less cemented deposit of calcium carbonate or of mixed calcium and magnesium carbonates, characteristic of soils of warm or hot desert and semiarid regions.

Carbon-Nitrogen Ratio - The relative proportion, by weight, of organic carbon to nitrogen in a soil. The number obtained by dividing the percentage of organic carbon in a soil by the percentage of nitrogen.

Catena Soil - A group of soils within one zonal region developed from similar parent material but differing in characteristics of the solum owing to differences in relief or drainage.

Chalk - A soft homogeneous material, composed entirely or almost entirely of calcium carbonate. Chalk like marl may be decomposed limestone high in lime. (Texas) The Austin chalk is a formation also underlying the Houston series in the southern part of the Blackland Prairies.

Chert - An amorphous (without definite structure) form of silica very closely allied to flint and characterized by a splintery fracture.

Clay - The small mineral soil grains, less than 0.002 mm. in diameter.

Claypan - A dense and heavy soil horizon underlying the upper part of the soil; hard when dry and plastic or stiff when wet; presumably formed in part by the accumulation of clay brought in from the horizons above by percolating water.

Climate - Refers to the prevailing weather conditions. Some illustrations are:

> Arid - A dry climate characteristic of desert and semidesert regions where precipitation effectiveness is such that only a sparse vegetation of desert plants prevails.
>
> Continental - A general term for the climate typical of great land masses, characterized by a great range of temperature and occurring in such parts of a continent as are not affected materially by nearness to the sea or other modifying influences.
>
> Humid - Generally, a climate with sufficient precipitation to support a forest vegetation, although there are exceptions.
>
> Mediterranean - A general term used in reference to warm-temperate climates, relatively dry in the warm season and relatively moist in the cool season.
>
> Oceanic - A general term for a climate modified by the tempering effect of ocean water, such that temperatures do not reach great extremes in either direction.
>
> Semiarid - Climate characteristic of the regions intermediate between the true deserts and subhumid areas under which precipitation effectiveness is such that a vegetation of scattered short grass, bunch grass, or shrubs prevails.
>
> Subhumid - A climate intermediate between semiarid and humid, with sufficient precipitation to support a moderate to dense growth of tall and short grasses but in most instances insufficient to support a dense deciduous forest.
>
> Wet - The climate in which precipitation effectiveness is such that rain-forest vegetation prevails.
>
> Wet-dry - The term "wet-dry" is applied to climate to indicate alternating wet and dry seasons, such as a wet summer and a dry winter, or the reverse.

Cohesion - The property of particles sticking together when dry forming clods or smaller granules.

Colloid, Soil - The term "colloid" is used in reference to matter, both inorganic and organic, having very small particle size and a correspondingly high surface area per unit of mass.

Collodial Matter - In soil is material either organic or inorganic that is of exceedingly fine size. It is as small or smaller than clay particles, but has accentuated such qualities as stickiness, gelatinous, absorptive, gummy, and plastic.

Colluvial - Soil material which has been moved down a steep slope a short distance by gravity and water. It is found at the base of a steep hill or bluff.

Colluvium - Heterogeneous deposits of rock fragments and soil material accumulated at the base of comparatively steep slopes through the influence of gravity, including creep and local wash.

Complex, Soil - A soil association composed of such an intimate mixture of areas of soil series, types, or phases that these cannot be indicated separately upon maps of the scale used so that the association is mapped as a unit.

Concretions - Local concentrations of certain chemical compounds, such as calcium carbonate or compounds of iron, that form hard grains or nodules of mixed composition and of various sizes, shapes, and coloring.

Conglomerates - A rock or rock masses composed of rounded fragments of stone cemented together by another mineral substance, either calcareous, or silicious or argillaceous.

Consistence, Soil - The relative mutual attraction of particles in the whole soil mass or their resistance to separation or deformation (as evidenced in cohesion and plasticity). Consistence is described by such general terms as loose or open; slightly, moderately, or very compact; mellow; friable; crumbly; plastic; sticky; soft; firm; hard; and cemented.

Consolidated (Soil material) - Made solid, by cementation or other processes, from a previous fluid or loosely aggregated condition.

Crust - A brittle layer of hard soil formed on the surface of many soils when dry.

Crust, Desert - A hardpan of calcium carbonate, gypsum, or other binding material exposed at the surface in desert regions by wind or water erosion. Some think that desert crusts form on the surface, but it is believed that more of them form in the soil and are exposed by subsequent erosion.

Cumulose - An organic accumulation, as peat.

Desert Soils - A zonal group of soils having a light-colored surface soil, usually underlain by calcareous material and frequently by a hardpan; developed under an extremely scant shrub vegetation in warm to cool arid climates.

Drift - Material of any sort deposited in one place after having been moved from another. Glacial drift includes glacial deposits, unstratified (till) and stratified glacial outwash materials.

Drouthy - A term used to indicate a soil with poor water-holding capacity due to such conditions as sand, gravel, or claypan in the subsurface or subsoil.

Drumlin - An oval hill of glacial drift, normally compact and unstratified, usually with its longer axis parallel to the movement of the ice responsible for its deposition.

Dune Sand - Wind-blown sand from lake or river beds, such as the Canadian or Red River, or from the ocean beach, or from residual sandy soils.

Edaphic - A general term for soil influences or conditions.

Eluviation - The movement of soil material from one place to another within the soil, in solution or in suspension, when there is an excess of rainfall over evaporation. Horizons that have lost material through eluviation are referred to as eluvial and those that have received material as illuvial. Eluviation may take place downward or sidewise according to the direction of water movement. As used, the term refers especially, but not exclusively, to the movement of colloids, whereas leaching refers to the complete removal of material in solution.

Erosion (Land) - The wearing away of the land surface by running water, wind, or other geological agents, including such processes as gravitational creep.

Normal - The erosion characteristic of the land surface in its natural environment, undisturbed by human activity, as under the protective cover of the native vegetation.

Accelerated - Erosion of the soil or rock over and above normal erosion brought about by changes in the natural cover or ground conditions, including changes due to human activity and those caused by lightning or rodent invasion.

(a) **Sheet** - Removal of a more or less uniform layer of material from the land surface. The effects are less conspicuous than those of other types of erosion that produce large channels. Frequently in sheet erosion the eroding surface consists of numerous very small rills.

(b) **Rill** - That type of accelerated erosion by water which produces small channels that can be obliterated by tillage.

(c) **Gully** -That type of accelerated erosion by water which produces channels larger than rills. Ordinarily, these erosion-produced channels carry water only during and immediately after rains, or following the melting of snow. Gullies are deeper than rills and are not obliterated by normal tillage.

Soil - Removal of soil material from the solum by wind or running water, including normal soil erosion and accelerated soil erosion. Sometimes used loosely in reference to accelerated erosion only.

Erosivity - The degree to which the land suffers from sheet and gully erosion.

Esker - A ridge formed in the terminal or marginal moraine area.

Ferruginous - Iron-bearing; usually refers to material of comparatively high iron oxide content.

Fertility (of soil) - The quality that enables a soil to provide the proper compounds, in the proper amounts and in the proper balance for the growth of specified plants, when other factors, such as light, temperature, and the physical condition of the soil, are favorable.

First Bottom - The normal flood plain of a stream, part of which may be flooded only at infrequent intervals.

Flocculate - To aggregate individual particles into small groups or granules; used especially with reference to clay and colloid behavior.

Flint - A massive somewhat impure variety of quartz, usually gray, brown or grayish black in color. Some quartz is black. It breaks with a conchoidal fracture, and was used by Indians for arrowheads. It is very hard and strikes fire with steel.

Flood Plain - The nearly flat surface subject to overflow along stream courses.

Fluviatile - Produced by river or other stream action. Fluviatile sediments are deposited along the sides or mouths of rivers.

Friable - Easily crumbled in the fingers; nonplastic.

Genesis, Soil - Mode of origin of the soil, referring particularly to the processes responsible for the development of the solum from the unconsolidated parent material.

Glacial Soil Material - Parent material of soil that has been moved and redeposited by glacial activity.

Glauconite - An amorphous (without definite structure) silicate of iron and potassium. Considerable aluminum may be present also.

Glei - Is applied to that mottled part of the soil, below the normal C Horizon, which is subject to ground water.

Gleization - A general term for the process of soil formation leading to the development under the influence of excessive moistening, of a glei (gley) horizon in the lower part of the solum. A soil horizon in which the material ordinarily is bluish gray or olive gray, more or less sticky, compact, and often structureless, is called a glei horizon and is developed under the influence of excessive moistening.

Great Soil Group (soil classification) - A group of soils having common internal soil characteristics; includes one or more families of soils. Among the zonal soils, each great soil group includes the soils having common internal characteristics developed through the influence of environmental forces of broad geographic significance, especially vegetation and climate; among the intrazonal soils, each great soil group includes the soils having common internal characteristics developed through the influence of environmental forces of both broad and local significance; among the azonal soils each great soil group includes similar soils that are without developed characteristics, because of some local condition of parent material or relief.

"Gyp" (Texas) - A local term used throughout the southwest referring to Gypsum.

Gypsum - Soil or water impregnated with gypsum. Gypsum is a hydrous sulphate of lime. When calcined it forms plaster of Paris.

Hardpan - An indurated (hardened) or cemented soil horizon. The soil may have any texture and is compacted or cemented by iron oxide, organic material, silica, calcium carbonate, or other substances.

Heavy - A term applied to a clay or clayey type of soil. Indicates a soil that is difficult to plow and in which water penetration is slow.

Hog Wallows - Depletions on a really level land surface in which water stands after rains.

Horizon, Soil - A layer of soil approximately parallel to the land surface with more or less well-defined characteristics that have been produced through the operation of soil-building processes.

Horizon A - The upper portion of the soil mass, the horizon of eluviation. Includes the horizons commonly called "surface" and " subsurface".
Horizon B - The horizon of deposition, commonly called the subsoil.
Horizon C - The horizon just beneath Horizon B leached of its carbonates.
Horizon D - The calcareous material beneath Horizon C which shows some oxidation.

Hummocks - Low mounds formed by the wind or by pasturing, in the case of swamp soils.

Humus - The well-decomposed, more or less stable part of the organic matter of the soil.

Igneous Rock - A rock produced through the cooling of melted mineral material.

Illuviation - The process of accumulation from percolating waters of material transported in solution or suspension. The subsoil or B Horizon is the zone of illuviation in the soil profile.

Immature Soil - A young or imperfectly developed soil.

Intractability - The characteristic of a soil of being difficult to work.

Intrazonal Soil - Any of the great groups of soils with more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief, parent material, or age over the normal effect of the climate and vegetation.

Kame - A short irregular ridge, hill, or hillock of stratified glacial drift. Most kames are hilly and are interspersed with depressions sometimes known as "kettles", having no surface drainage.

Lacustrine Deposits - Materials deposited by lake waters.

Lampasas Cut Plain (Texas) - The high, rolling and deeply dissected limestone area in Lampasas, San Saba, and Burnet Counties, crossed by a number of deep valleys through which rivers flow in narrow strips of bottom land.

Land - The total natural and cultural environment within which production must take place. Its attributes include climate, surface configuration, soil, water supply, subsurface conditions, etc., together with its location with respect to centers of commerce and population. It should not be used as synonymous with soil or in the sence of the earth's surface only.

Agricultural - Land in farms regularly used for agricultural production. The term includes all the land devoted to crop or livestock enterprises; i.e., the farmstead, lanes, drainage and irrigation ditches, water supply, cropland, and grazing land of every kind in farms.

Arable - Land which, in its present condition, is physically capable, without further substantial improvement, of producing crops requiring tillage.

Badland - Nearly or partly barren, rough, broken land strongly dissected by streams; most common in semiarid and arid regions, where streams have entrenched themselves in soft geological materials, such as clays, soft shales, sandstones, and limestones.

Cropland - Land regularly used for crops, except forest crops. Cropland includes rotation pasture, cultivated summer fallow, or other land ordinarily used for crops but temporarily idle.

Forest - Land not in farms, bearing a stand of trees of any age or stature, including seedlings (reproduction), but of species attaining a minimum average height of 6 feet at maturity. Forest on farms is called farm woodland or farm forest.

Grazing - Land regularly used for grazing, except cropland and rotation pasture. It is not confined to land suitable only for grazing.

Scabland - Land characterized by numerous outcrops of lava rock or scoria. This term, or "scabby land," is also applied locally to land having a large number of bare spots.

Waste - Land essentially incapable of producing materials or services of value. This term should not be used to describe idle farm or forest land.

Land Classification - Classification of specific bodies of land according to their characteristics or to their capabilities for use.

Land Reclamation - Making land capable of more intensive use by changing its character, environment, or both through operations requiring collective effort.

Land Type - Land uniformly possessed of particular distinguishing characteristics. A natural land type is land having a particular set of defined natural characteristics, principally of soil, climate, relief, stoniness, and native vegetation.

Land-Use Planning - The development of plans for the uses of land that will, over a long period, best serve the general welfare, together with the formulation of ways and means of achieving such uses.

Leaching - Removal of materials in solution.

Lime - Strictly, calcium oxide (CaO), but, as comonly used in agricultural terminology, calcium carbonate ($CaCO3$) and calcium hydroxide ($Ca(OH)2$) are included. Agricultural lime refers to any of these compounds, with or without magnesia used as an amendment for acid soils.

Limestone - A general name for rocks composed essentially of calcium carbonate.

Loess - Rock flour, produced by glacial action, which has been deposited as alluvial material and then blown and redeposited by the wind.

Limonite - A hydrated oxide of iron occurring in rock form.

Marine - Soil material deposited in the ocean or bay.

Marl - An earthy crumbling deposit consisting chiefly of calcium carbonate mixed with clay or other impurities in varying proportions. It is used frequently as an amendment for soils deficient in lime.

Mature Soil - A soil with well-developed characteristics produced by the natural processes of soil formation, and in equilibrium with its environment.

Mellow Soil - A soil that is easily worked or penetrated.

Mineral Soil - A general term used in reference to any soil composed chiefly of mineral matter.

Mottled (mottling) - Irregularly marked with spots of different colors.

Muck - Fairly well decomposed organic soil material, relatively high in mineral content, dark in color, and accumulated under conditions of imperfect drainage.

Neutral Soil - A soil that is not significantly acid or alkaline.

Nitrification - Formation of nitrates from ammonia as in soils by soil organisms.

Nitrogen Fixation - The conversion of atmospheric (free) nitrogen to nitrogen compounds. In soils, the assimilation of free nitrogen from the air by soil organisms.

Noncalcareous - Free from calcium carbonate.

Normal Soil - A soil having a profile in equilibrium with the two principal forces of the environment - native vegetation and climate - usually developed on the gently undulating (but not strictly level) upland, with good drainage, from any parent material, not of extreme texture or chemical composition, that has been in place long enough for biological forces to exert their full effect.

Organic Matter - The more or less decomposed material of the soil derived from organic sources, usually from plant remains.

Organic Soil - A general term used in reference to any soil the solid part of which is predominantly organic matter.

Paha - In the Iowan Drift area corresponds to Kame formation in the Wisconsin Drift area.

Parent Material - The unconsolidated mass from which the soil profile develops.

Parent Rock - The rock from which parent materials of soils are formed.

Peat - Unconsolidated soil material consisting largely of undecomposed or slightly decomposed organic matter accumulated under conditions of excessive moisture.

Pedalfer - A soil in which there has been a shifting of alumina and iron oxide downward in the soil profile but with no horizon of carbonate accumulation. Roughly equivalent to "soils of the humid regions."

Pedocal - A soil with a horizon of accumulated carbonates in the soil profile. Roughly equivalent to "soils of the arid and semiarid regions."

Pedology - The science that treats of soil; soil science.

pH - A notation introduced by Sorensen to designate relatively weak acidity and alkalinity, such as is encountered in soils and biological systems.

Permian Redbeds (Texas) - Part of 58 counties comprising the rolling plains area in northwest Texas. The soils here are derived from rocks of Permian origin which are of ferruginous nature (high in iron oxide) and give the red color to the materials. Thus the term "Red Beds" or "Red Lands of Northwest Texas."

Phase, Soil - That part of a soil unit or soil type having minor variations in characteristics used in soil classification from the characteristics normal for the type, although they may be of great practical importance. The variations are chiefly in such external characteristics as relief, stoniness, or accelerated erosion.

Plastic - Capable of being molded or modeled without rupture; not friable.

Playa (Texas) - Lakes which dry up in dry weather. Frequently found in rolling plains, high plains, and the Edwards Plateau.

Porosity, soil - The degree to which the soil mass is permeated with pores or cavities. It is expressed as the percentage of the whole volume of the soil which is unoccupied by solid particles.

Porous - The characteristic of allowing rapid passage of water.

Prairie Soils - The zonal group of soils having a very dark brown or grayish-brown surface horizon, grading through brown soil to the lighter colored parent material at 2 to 5 feet, developed under tall grasses, in a temperate, relatively humid climate. The term has a restricted meaning in soil science and is not applied to all dark-colored soils of the treeless plains but only to those in which carbonates have not been concentrated in any part of the profile by the soil-forming processes.

Productivity (of soil) - The capability of a soil for producing a specified plant or sequence of plants under a specified system of management.

Profile, Soil - A vertical section of the soil through all its horizons and extending into the parent material.

Push Soil (Iowa) - Term applied to side hill seepage areas or exposures of Kansas Till, especially in Southern Iowa Loess area.

Reaction, Soil - The degree of acidity or alkalinity of the soil mass expressed in pH values, or in words as follows:

	pH		pH
Extremely acid	Below 4.5	Slightly acid	6.1-6.5
Very strongly acid	4.5-5.0	Neutral	6.6-7.3
Strongly acid	5.1-5.5	Mildly alkaline	7.4-8.0
Medium acid	5.6-6.0	Strongly alkaline	8.1-9.0
		Very str.alkaline	9.1 & higher

GLOSSARY OF SOIL TERMS

Red Desert Soil - A zonal group of soils having light reddish-brown friable soil over a reddish brown or dull-red heavy horizon grading into an accumulation of carbonate of lime: found in warm-temperate and tropical deserts and characterized by more or less scant desert-shrub vegetation.

Relief - The elevations or inequalities of a land surface, considered collectively.

Residual or Sedentary Material - Soil material presumably developed from the same kind of rock as that on which it lies. The term "residual" is sometimes incorrectly applied to soils.

Residuum - A term applied to soil which has been altered in its present location, chemically or physically from its original condition.

Rotation - The growing of two or more crops on the same piece of land in different years sequence and according to a definite plan.

Saline Soil - A soil containing an excess of soluble salts, more than approximately 0.2 per cent, not excessively alkaline, pH less than 8.5.

Salt - The product other than water, of the reaction of a base with an acid.

Salt Domes (Texas) - Low symmetrical mounds found in flat areas, generally in the Gulf Coastal Plain.

Sand - Small rock or mineral fragments having diameters ranging from 1 to 0.05 mm. The term "sand" is also applied to soils containing 90 per cent or more of all grades of sand combined. Although usually made up chiefly of quartz, sands may be composed of any materials or mixtures of mineral or rock fragments.

Scalds - Eroded areas on side hills where subsoil is exposed.

Second Bottom - The first terrace level of a stream valley lying above the flood plain, rarely or never flooded.

Sedimentary Rock - A rock composed of particles deposited from suspension in water. The chief groups of sedimentary rocks are (1) conglomerates (from gravels), (2) sandstones (from sands), (3) shales (from clays), and (4) limestones (from calcium carbonate deposits); but there are many intermediate types.

Series, Soil - A group of soils having genetic horizons similar as to differentiating characteristics and arrangement in the soil profile, except for the texture of the surface soil, and developed from a particular type of parent material. A series may include two or more soil types differing from one another in the texture of the surface soils.

Silt - Small mineral soil grains the particles of which range in diameter from 0.05 to 0.002 mm. (or 0.02 - 0.002 mm. in the international system).

Slick Spots - Develop where the leaching of materials, chemically known as bases, from the layer of loess above is arrested by the presence of a slowly pervious layer formed in the drift below. These bases are thrown out of solution as the water evaporates; they accumulate in the soil, thus bring about an alkaline condition. This accumulation produces an excess of soluble salts, which either unbalance plant food conditions or else actually produce toxic conditions for plant growth. In the field they can be identified by their lighter colored surface and their differing moisture conditions from those of the surrounding soil.

Soil - The natural medium for the growth of land plants on the surface of the earth. A natural body on the surface of the earth in which plants grow, composed of organic and mineral materials.

Soil Class - The texture of the soil.

Soil Climate - Moisture and temperature conditions within the soil.

Soil Map - A representation designed to portray the distribution of soil types, phases, and complexes as well as other selected cultural and physical features of the earth's surface necessary for convenience in its use.

Detailed - The boundaries between the soil types and phases are plotted upon the base map from precisely located points and from observations made throughout their course in sufficient detail to indicate those differences of significance in the use of the land.

Reconnaissance - The boundaries between the soil types and phases are plotted from observations made at intervals.

Detailed-reconnaissance - A map having parts constructed according to the requirements of the detailed soil map and parts according to the less rigid requirements of the reconnaissance soil map.

Solum - The upper part of the soil profile, above the parent material, in which the processes of soil formation are taking place. In mature soils this includes the A and B horizons, and the character of the material may be, and usually is, greatly unlike that of the parent material beneath. Living roots and life processes are largely confined to the solum.

Strata - Formations laid down by water, ice, or wind.

Stratified - Composed of, or arranged in, strata or layers, as stratified alluvium. The term is applied to geological materials. Those layers in soils that are produced by the processes of soil formation are called horizons, while those inherited from the parent material are called strata.

Stratum - A layer of material whose character was established during formation of parent materials by some geological agency.

Structure, Soil - The morphological aggregates in which the individual soil particles are arranged. The following are the principal types of soil structure:

Prismatic-Blocky structure with the vertical axis of the blocks longer than the horizontal.

Nutlike - Blocky structure, angular.

Columnar - Prismatic with rounded tops.

Platy - Thin horizontal plates.

Crumb - Generally soft, small, porous aggregates, irregular in shape.

Granular - Hard or soft but firm small aggregates, angular or rounded.

Phylliform - Thin leaflike layers, less distinct and thinner than platy.

Single Grain - Each grain by itself, as in dune sand (structureless).

Fragmental - Hard or soft but firm irregular aggregates, angular or subangular as in many young soils developed from silty or clayey alluvium.

Massive - Large uniform masses of cohesive soil, sometimes with irregular cleavage.

Subsoil - Roughly, that part of the solum below plow depth.

Surface Soil - That part of the upper soil of arable soils commonly stirred by tillage implements or an equivalent depth (5 to 8 inches) in nonarable soils.

Talus - Fragments of rock and soil material collected at the foot of cliffs or steep slopes, chiefly as a result of gravitational forces.

Terminal Moraine - The rock debris deposited by glacier in front of the ice at any point where the glacial terminus remained stationary for a time. The topography is usually rolling to rough.

Terrace (for control of run-off, or soil erosion, or both) - A broad surface channel or embankment constructed across the sloping lands, on or approximately on contour lines, at specific intervals. The terrace intercepts surplus run-off, to retard it for infiltration or to direct the flow to an outlet at nonerosive velocity.

Terrace(geological) - A flat or undulating plain, commonly rather narrow and usually with a steep front, bordering a river, a lake, or the sea. Many streams are bordered by a series of terraces at different levels, indicating the flood plains at successive periods. Although many older terraces have become more or less hilly through dissection by streams, they are still regarded as terraces.

Texture, Soil - The relative proportion of the various sizes groups of individual soil grains.

Soil Separates - The individual size groups of soil particles such as sand, silt, and clay.

Soil Class - Classes of soil based on the relative proportion of soil separates. The principal classes, in increasing order of the content of the finer separates, are as follows: Sand, loamy sand, sandy loam, loam, silt loam, clay loam, and clay.

Till (glacial) - A deposit of earth, sand, gravel, and boulders transported by glaciers. Till is unstratified.

Till Plain - A level or undulating land surface covered by glacial till.

Tilth - The physical condition of a soil in respect to its fitness for the growth of a specified plant.

Topography - Surface configuration of the land.

Topsoil - A general term applied to the surface portion of the soil, including average plow depth (surface soil) or the A horizon, where this is deeper than plow depth. It cannot be precisely defined as to depth or productivity except in reference to a particular soil type.

Transition Soil - Soil that does not clearly belong to any important soil group or series with which it is associated, but has some properties of each.

Transported Soil Materials - Parent materials of soils that have been moved from the place of their origin and redeposited during the weathering process itself or during some phase of that process, and which consist of, or are weathered from, unconsolidated formations.

Type, Soil - A group of soils having genetic horizons similar as to differentiating characteristics, including texture and arrangement in the soil profile, and developed from a particular type of parent material.

Unconsolidated (soil material) - Soil material in a form of loose aggregation.

Water Table - The upper limit of the part of the soil or underlying material wholly saturated with water.

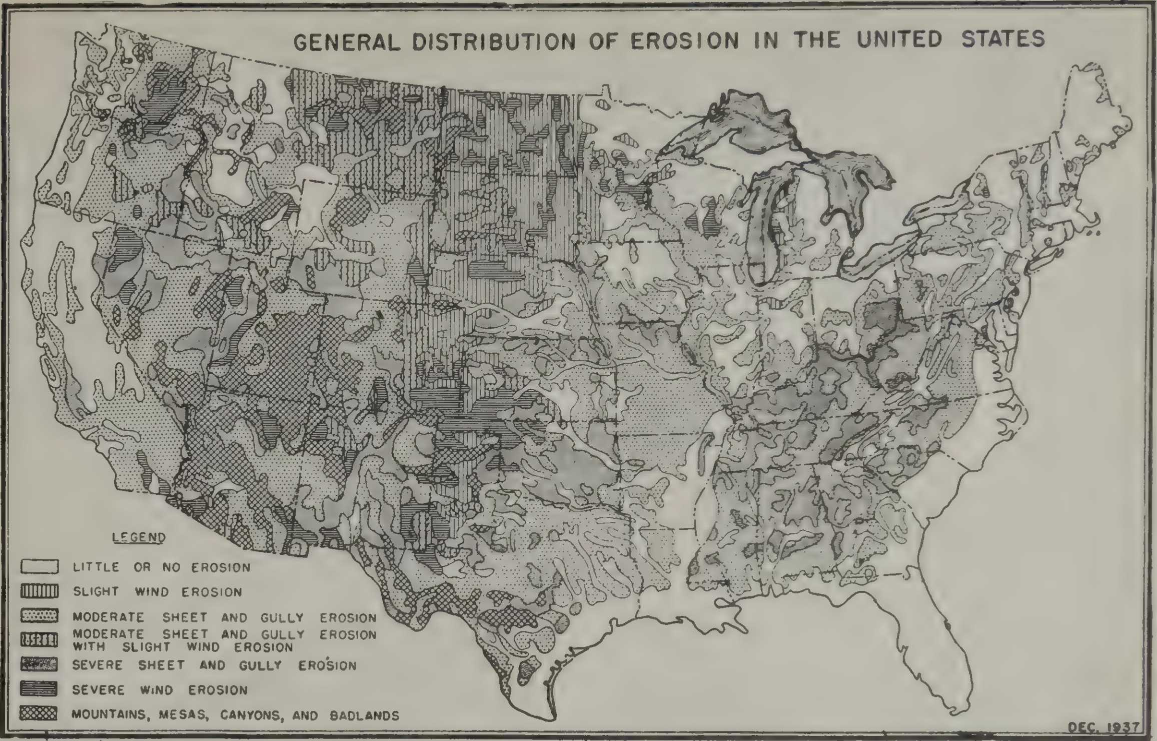
Weathering - The physical and chemical disintegration and decomposition of rocks and minerals.

Zonal Soil - Any one of the great groups of soils having well-developed soil characteristics that reflect the influence of the active factors of soil genesis--climate and living organisms, chiefly vegetation.

650 Erosion, Drainage, Irrigation

650 Erosion, Drainage, Irrigation

SOIL EROSION


GENERAL DISTRIBUTION OF EROSION IN THE UNITED STATES
LEGEND
LITTLE OR NO EROSION
SLIGHT WIND EROSION
MODERATE SHEET AND GULLY EROSION
MODERATE SHEET AND GULLY EROSION WITH SLIGHT WIND EROSION
SEVERE SHEET AND GULLY EROSION
SEVERE WIND EROSION
MOUNTAINS, MESAS, CANYONS, AND BADLANDS
DEC. 1937

About one acre out of every ten used for crops is so severely eroded that it should be removed from cultivation and kept in hay or pasture. This includes all summer fallow land and pasture in rotation with crops - a total of 50,000,000 acres out of a total of 500,000,000 acres used for crops.

These 50,000,000 acres of land formerly cultivated and now rendered incapable of practical cropping by gullying and soil removal make up an area equal to the crop land of New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, the Virginias, the Carolinas, and Georgia. In addition, much of the topsoil has been removed from 100,000,000 acres, or one out of every five acres, to an extent that greatly reduces the productivity.

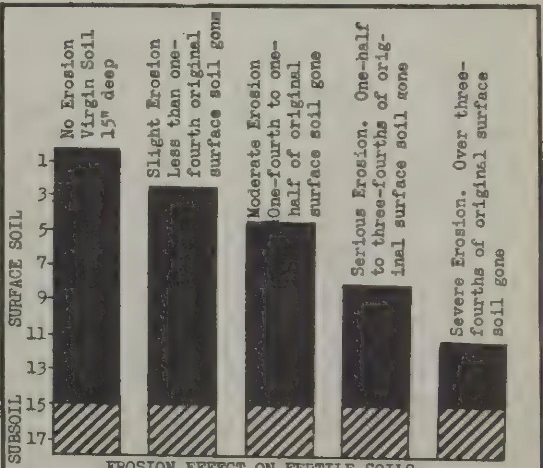
This is a terrific loss and land waste for a country so young as the United States.

It is estimated that since Missouri land was placed in cultivation, soil washing has removed the three most important fertility elements to the following extent:

	Tons
Nitrogen	26,090,000
Phosphorus	13,030,000
Potassium	300,240,000

These Missouri figures are typical of what has happened in many other states where less accurate data are available.

Many farms cannot successfully withstand as severe erosion losses during the next 50 years as have taken place during the past half century. So much humus and surface soil have already been removed that without control, the soil and fertility loss in the future will be even more rapid than in the past. Uncontrolled soil erosion leads directly to abandoned farms, unattractive landscapes, and impoverished agricultural areas.



EROSION EFFECT ON FERTILE SOILS

Erosion removes fertile surface soil from Missouri's farm lands. The bars represent actual samples of soil taken from different places in what was once one of the best soil areas in Missouri. The sample shown at the left is from a field which has been well cared for and little or no erosion has occurred. The other samples were taken from fields where less care has been taken. Excessive corn farming has resulted in varying degrees of loss of the surface soil and the sample at the right has had three-fourths of the surface soil washed away. Most of the serious erosion losses are due to improper cropping systems.

Based on Data of U.S.D.A. and Missouri College of Agriculture
U.S.D.A. Yearbook Soils & Men 1938

SOIL EROSION

The map shows six classes of erosion. The first, where erosion is unimportant, except locally, is the same as the slight-erosion class, as defined. Two classes of slight erosion are shown on the map, one without and one with wind erosion. Severe erosion is similarly divided to show the occurrence of wind erosion. The class, essentially destroyed for tillage, as described, occurs in small disconnected areas that cannot be shown on a generalized map, but are included for the most part with severe-erosion classes.

Acreages affected and the degree of erosion by geographic regions

Geographic division	Total area	Slight erosion (except locally)		Moderate erosion	
	Acres	*Acres*	*Percent*	*Acres*	*Percent*
New England	39,603,531	36,136,685	91.2	3,421,425	8.6
Middle Atlantic	63,932,395	38,170,914	59.7	24,203,123	37.9
East North Central	157,012,381	101,159,655	64.4	46,603,415	29.7
West North Central	326,785,527	169,553,374	51.9	110,547,744	33.8
South Atlantic	172,084,524	96,145,242	55.9	58,254,349	33.8
East South Central	114,966,646	20,867,469	18.1	59,633,056	51.9
West South Central	276,410,538	92,887,885	33.6	112,236,821	40.6
Mountain	548,871,903	63,757,642	11.6	265,880,663	48.4
Pacific	203,509,175	81,833,145	40.2	94,897,435	46.6
Total area	1,903,176,620	700,512,011	36.8	775,678,031	40.8

Geographic division	Severe erosion		Essentially destroyed for tillage		Mountains, mesas, and badlands	
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
New England	20,312	0.1	25,109	0.1	0	-------
Middle Atlantic	1,426,037	2.2	132,321	.2	0	-------
East North Central	5,901,951	3.8	3,347,360	2.1	0	-------
West North Central	35,819,906	11.0	6,918,801	2.1	3,945,702	1.2
South Atlantic	12,205,520	7.1	5,479,413	3.2	0	-------
East South Central	26,512,777	23.1	7,953,344	6.9	0	-------
West South Central	25,489,808	9.2	25,216,849	9.1	20,579,175	7.5
Mountain	102,426,058	18.7	4,608,560	.8	112,198,980	20.5
Pacific	15,212,494	7.5	3,521,643	1.7	8,044,458	4.0
Total area	225,014,863	11.8	57,203,400	3.0	144,768,315	7.6

Slight erosion.—These areas have lost generally less than 25 percent of the original surface soil. They include flat lands and swamps such as those of the lower Coastal Plains and the old glacial lake plains; most of the larger flood plains; gently undulating plains of the Midwest; smooth to gently undulating brush-covered plains of the arid West; forested lands that have been largely protected from erosion by vegetative cover; and slight wind-erosion areas having small amounts of soil removed and local accumulations of wind-blown material.

This class accounts for approximately 37 percent of the land area of the United States, or 700,500,000 acres. The cropland areas falling in this group can be largely protected from erosion by good crop rotations, supplemented by contour tillage operations where necessary. The pasture and wooded areas included in this group are likewise easily protected from erosion, owing to the soil and topographical conditions.

Moderate erosion.—This includes the following conditions occurring singly or in combination with each other or with slight erosion: 25 to 75 percent of the original surface soil lost and occasional or frequent gullies occurring either with slight or moderate sheet or wind erosion.

The acreage included in this class deserves attention for two reasons: (1) Approximately 41 percent of the land area of the United States falls in this group; and (2) the erosion problems can usually be solved today, but they may become difficult to control in a few years if allowed to go unchecked. The costs necessary to control erosion in this group at the present time are low as compared to the costs that will be necessary in the future to assure permanent utilization on these same acres, if they are allowed to go unprotected for a much longer period. Decidedly more rigid erosion-control practices should be recommended for this area than for those in the first group.

Severe erosion.—This includes the following conditions, occurring either singly or in combination with gullies or moderate sheet or wind erosion: Severe sheet erosion, where more than 75 percent of the original surface soil has been lost; and severe wind erosion, with large amounts of surface soil removed and local destructive accumulations.

The area included in this group (225,015,000 acres) needs immediate attention to prevent erosion from devastating it. Approximately 12 percent of the entire land area of the United States is included in this class. To be sure, some parts are already submarginal as operated today, but it does not follow that, with proper land-use management and effective erosion-control practices, this area cannot be made safe for the future. In many instances cropland should be retired to grasses, pasture areas retired to woodland, and gullies stabilized. Dedication of this area to its proper land use is not sufficient to meet the problems; application of vegetative and mechanical control measures is needed to prevent further soil losses.

Essentially destroyed for tillage.—This includes combined severe sheet erosion and severe gullies; destructively large or frequent gullies; or extreme wind erosion.

Since presence of gullies or severe sheet or wind erosion does not prohibit some growth of certain grasses or trees, it is practically impossible to pronounce an area as entirely destroyed. In many instances, however, areas which once had good soil have been either entirely eroded or are in such condition that the land is practically worthless to the present generation. This classification accounts for approximately 57,203,000 acres, or 3 percent of the total land in the United States. Nearly half of this area is in the West South Central States.

Mesas, canyons, scablands, badlands, and rough mountain land.—Moderate to severe accelerated erosion caused by both water and wind occurs on some overgrazed mountainous lands. Approximately 7.6 percent of the land in the United States, or 144,768,000 acres, is in this class. The bulk of the acreage is in the western mountain States, where a division between geological erosion and man-made accelerated erosion is very difficult to establish. The area included in this group is not important from an erosion-control standpoint.

The form which accelerated erosion assumes and the extent to which it occurs are closely related to the climatic conditions and to the nature of the soil. Adjustments in cropping practices made to minimize erosion losses must be based on an understanding of the climatic and soil conditions which determine the erosion hazard. Since there is a correspondence between the broad climatic regions and the principal soil provinces, these erosion hazards can be defined as they apply to each climatic region. In each such region the clearing of land for cultivation results in the creation of different erosion hazards, both as to the types of accelerated erosion which are apt to occur and as to their intensity

In the superhumid climates both the intensity and the amount of rainfall are high. Gullying, sheet wash, trenching, and siltation therefore constitute the principal erosion hazards. The lateritic soils of the wet climatic regions are characterized by deep clays which are highly resistant to erosion. But the topsoil, comparatively low in organic matter, is not resistant and can be easily sluiced away.

In the humid climates the intensity and amount of rainfall are highest in the equatorward regions, decreasing poleward. Gullying and sheet wash are therefore more serious in the warm humid regions, such as the southeastern United States, than in the cool parts of the humid areas, such as New England. In the cooler humid climates the prevalence of snow during the winter leads to the existence of a flood hazard, which is accentuated by deforestation. In addition, frost action in these areas, which, particularly on unprotected sod, results in soil heaving, promotes the mass movement of materials downslope. The Red and Yellow Podzolic soils of the warm humid climates have a deep clay B horizon which does not readily erode; but once this clay horizon has been removed, the rate of downward gully cutting may increase enormously, and extensive areas may be laid waste within a few years (7). The Podzols and Gray-Brown Podzolic soils are not so resistant as the Red and Yellow soils, but since they occur in areas where rainfall intensities are lower and since in the winter they are protected from erosion through freezing, not so much gullying and sheet washing is apt to occur.

The soils of subhumid regions, formed under tall-grass conditions, are generally high in organic matter, particularly in the warm subhumid areas. As a result the surface horizon is capable of absorbing considerable amounts of water so that gullying and sheet wash are decreased. Drought constitutes a hazard. Not only does it result in the depletion of vegetal cover, but it alters the physical structure of the surface soil, making it peculiarly susceptible to erosion by running water. If, as is frequently the case, a drought is broken by an intense downpour, gullying and sheet wash can set in in spite of the high organic-matter content of the A horizon.

The wind-erosion hazard becomes critical in semiarid regions. Most of the semiarid lands of the world are relatively flat so that high wind velocities can develop without being impeded by the presence of topographic barriers. In spite of the relatively low rainfall intensities in semiarid regions, serious gullying and sheet washing occur where the resistance of the land to erosion has been lowered through overgrazing. The bottom lands, usually the most productive areas of these regions, are particularly susceptible.

Plant nutrients annually lost from soils of the United States[1]

Losses through—	Nitrogen	Phosphorus	Potassium	Calcium	Magnesium	Sulphur	Organic matter
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*
Crops (harvested areas)	4,600	700	3,200	1,000	500	500	92,000
Grazing (pastures)	3,000	500	3,700	1,000	500	400	60,000
Leaching (harvested areas)	4,000	----------	6,600	26,600	6,000	7,400	80,000
Erosion (harvested areas)	2,500	900	15,000	13,000	6,000	800	50,000
Leaching (pastures)	1,000	----------	1,700	7,000	1,600	1,900	20,000
Erosion (pastures)	1,000	400	6,000	5,000	2,200	300	20,000
Total	16,100	2,500	36,200	53,600	16,800	11,300	322,000

. . . 22 percent of the nitrogen losses, 52 percent of the phosphorus losses, 58 percent of the potassium losses, 34 percent of the calcium losses, 49 percent of the magnesium losses, 10 percent of the sulphur losses, and 22 percent of the losses of organic matter are due to erosion.

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[1] Area considered: Harvested crops, 365 million acres; pasture and woodland grazing areas, 1,000 million acres.

FARMING FOR KEEPS

Soil conservation is proper use and care of the land. It means using the land to produce the greatest long-term income and at the same time protecting it so its productive power will be maintained or increased. Everything that helps keep the soil productive is a part of conservation.

WIND EROSION TAKES ITS TOLL

WATER EROSION TAKES ITS TOLL

SCS

Soil conservation begins with planning the use of the land. The first basic problem is to decide whether the land is best suited to crops, permanent pasture or timber. Each of these major uses presents its own conservation problem.

Timber that is protected from grazing livestock and fire seldom presents a serious erosion problem. Pastures that are not over grazed and that receive enough lime and fertilizer to replace the fertility elements removed by grazing livestock, seldom wash.

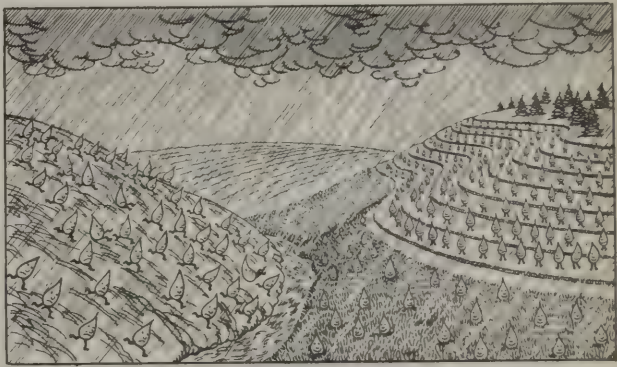
Cropland presents the real problem. Plowing changes the structure of the soil and causes the organic matter to burn out rapidly. After crops are harvested in the fall most cropland lays bare or with little cover until the next spring. One of the most dangerous periods of all is in the early part of the growing season before the new crops get up enough to protect the soil.

CONSERVATION PRACTICES

Crop Rotation, Lime And Fertilizer -- The three corner stones of progressive farming. They are basic to all soil conservation measures on cropland. In many of the nation's better farming areas, these practices provide complete protection. Rotations can also be used with strip-cropping by inter-changing the tilled strips with the close growing strips of grass and small grain.

Contouring -- Farming around hillsides with curving furrows to fit the lay of the land instead of straight furrows up-and-down hill. The curved furrows catch rainfall and allow much of it to soak into the ground. This conserves water and reduces the amount of soil that is washed away. Part of the water that soaks into the soil is used later by crops. Another part is added to the underground water supply to feed springs, wells, streams, and ponds. Contouring will do the job on gentle slopes but has many limitations under practical farm conditions.

Strip Cropping -- Planting strips of close growing plants -- like grass or clover -- between alternate strips of clean-tilled row crops, on or nearly on the contour. The strips of close-growing plants hold water and keep it from eroding the cultivated strip below. They also catch soil picked up by water from the plowed strips above, straining it out of the runoff. WIND STRIPPING is planting alternate strips of clean-tilled and thick crops at right angles to the prevailing wind. FIELD STRIPPING is planting alternate strips of cultivated and thick crops roughly at right angles to the main slope of the land. Properly used strip cropping is one of the most effective soil conservation practices. One big limitation is that field arrangements must be completely changed.



COLORADO EXT. BULLETIN 362-A
Keep the raindrops where they fall, or make "running water walk:" then we have very little erosion and no floods

Terracing -- Ridging land on or nearly on the contour. The farmer builds up low barriers -- ridges or embankments -- of soil across sloping fields to intercept rainfall. Terraces with slight grade slow down runoff water, guiding it to safe disposal at the sides of the fields. This controlled surplus water runs off too slowly to cause erosion. Level terraces hold all the rainfall on the land. Terraces should be used with care. When neglected they may increase erosion rather than retard it. Terraces used in connection with strip cropping will give greater protection than either practice alone.

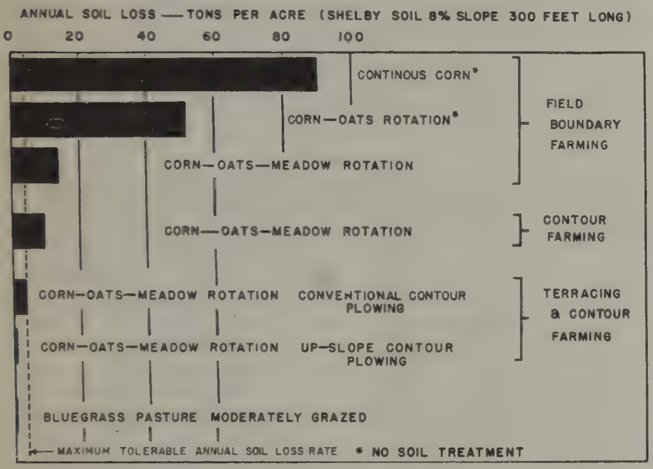
Stubble-Mulching or Mulching -- This practice is also called "trashy cultivation" and "subsurface tillage". It means leaving crop residues and soil improving crops on the surface of the ground instead of turning them under or burning them. These materials include grain stubble, straw, cornstalks, cro-

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo

FARMING FOR KEEPS

talaria, lespedeza, and other protective crops. Mulching protects the soil from erosion and baking, cuts down evaporation, helps the soil to soak up more rainfall, and aids growth of useful bacteria in the soil. The practice requires implements that do not turn the soil over. Mulching is a common practice in the sub-humid areas of the wheat belt and in sandy soils where wind erosion is a problem.

Gully Control -- Use of plants and mechanical measures to stop eroding gullies. These measures reduce the rate of water flow within gullies or divert the water away from heads and sides of gullies. It is done by using: (1) Grass, vines, trees, and shrubs to line the gully; (2) flumes and other devices to reduce the cutting power of waterfalls; and (3) dams for catching silt. Gully control represents the last line of defense against soil erosion. When other measures have been successfully applied, gullies do not have a chance to develop.



Effect of the conservation practices on erosion. Shelby soil of average slopes.

MISSOURI BUL. 518

Pasture And Range Land Conservation measures include rotation grazing, mechanical treatment, water spreading and spacing of waterholes whenever possible.

Rotation grazing is a method of conservation that can be worked in with regular ranch procedure. Follow a system that allows rest periods during certain times of the year. A good plan on some ranches is to pasture the uplands in the spring when the lowlands may be wet and switch later in the summer so the upland grass can go to seed.

Mechanical treatment is the construction of contour ditches to spread runoff and the building of check dams in gullies and draws. Water spreading can be worked in here by building the level type of terraces to keep the water on the soil until it is soaked up. Spacing of water holes and proper location of salt are two important steps in getting complete coverage of pasture to prevent overgrazing in the area near the waterhole.

KNOW YOUR FARM

Every farm is different when it comes to conservation planning. A plan that works perfectly on one farm may only make a bad situation worse on another.

The land capability map is the first step in planning your conservation program. This is an inventory of the soils found on the farm. It is more than a soil map because it shows also slope and degree of erosion.

A reduction in this herd of Herefords on a Colorado ranch brought about a 100-percent calf crop, better animals, more forage, and a higher net income to the owner. COLO

After the land capability map has been prepared, use it to work out the conservation plan for the farm. In some of the better farming areas this may mean only a change in the rate of lime and fertilizer application. In other areas it may involve a change in rotation or the use of one or more special practices.

(Technical assistance in preparing these maps and setting up the plans is available through the Soil Conservation Service. The government provides this as a public service).

CARRY OUT THE PLAN

The best laid plans do no good unless they are put to work on the farm. The University of Illinois compared results on 105 farms. They found that it took $34 per acre to buy the fertilizer and lime, control the water, put up the buildings and buy the equipment and livestock needed to carry out the conservation program set up on the farms studied. It took just a little over 3 years to get the money back and every farmer had a better farm to show for it.

AN OKLAHOMA PAPER PUBLISHED A PICTURE OF A DILAPIDATED HOUSE AND A WASHED AWAY FIELD AND ASKED READERS TO TELL WHAT THIS MEANT TO THEM. AN INDIAN WON WITH THIS:

"PICTURE SHOW WHITE MAN CRAZY. MAKE BIG TEPEE. PLOW HILL. WATER WASH. WIND BLOW SOIL. GRASS ALL GONE. SQUAW GONE. PAPOOSE TOO. NO PIG. NO CORN. NO HAY. NO COW. NO PONY.

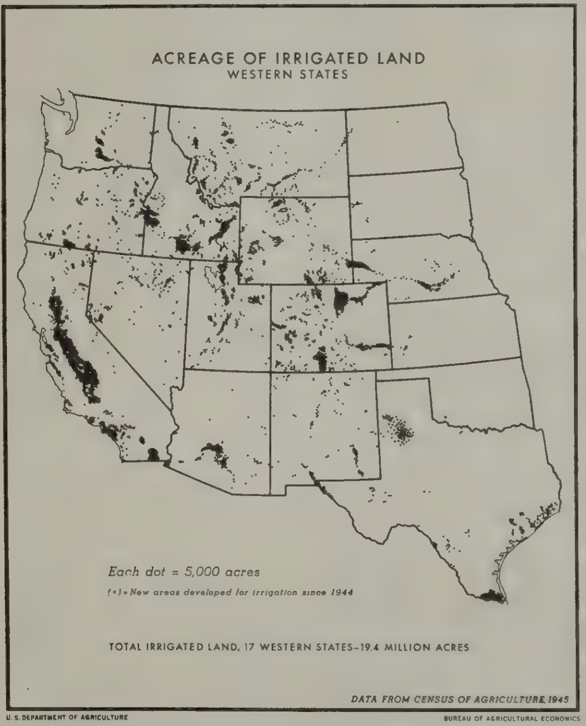
"GREAT SPIRIT MAKE GRASS. INDIAN NO PLOW LAND. KEEP GRASS. BUFFALO EAT GRASS. INDIAN EAT BUFFALO. HIDE MAKE TEPEE. MOCCASINS TOO. INDIAN NO MAKE TERRACE. NO BUILD DAM. NO GIVE DAMN. ALL TIME EAT. NO HUNT JOB. NO HITCH-HIKE. NO ASK RELIEF. NO SHOOT PIG. INDIAN NO WASTE ANYTHING. INDIAN NO WORK. WHITE MAN HEAP CRAZY."

Source materials selected from: Colorado State College Extension Bulletin 362-A, USDA Farmers Bulletin 1776, University of Missouri Bulletin 518, and USDA Misc. Publication 596.

IRRIGATION FARMING

The last ten years have seen a big expansion in the development of irrigation. The need for more production during the war years and the higher level of prices for agricultural goods stimulated the progress of irrigation.

All but about 5 per cent of the irrigated land is in the 17 Western states. However, large acreages of rice are irrigated in Arkansas and Louisiana, and large acreages of vegetables are irrigated in Florida.


ACREAGE OF IRRIGATED LAND
WESTERN STATES
Each dot = 5,000 acres
(×) = New areas developed for irrigation since 1944
TOTAL IRRIGATED LAND, 17 WESTERN STATES–19.4 MILLION ACRES
DATA FROM CENSUS OF AGRICULTURE 1945
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Irrigation farming has developed into a distinctive type in most parts of the West. The kinds of crops grown are different, and the cropping rotations practiced on irrigated farms are usually more intensive than those found on dry land farms.

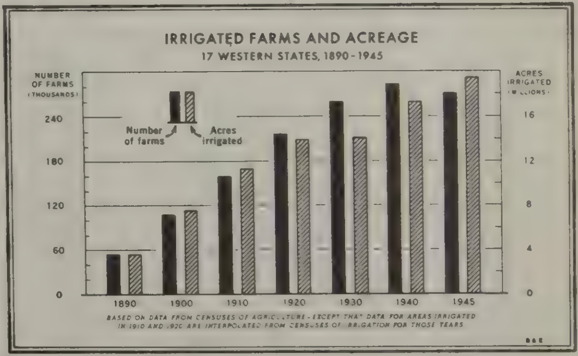
Many farmers and ranchers use irrigation primarily in the growing of feed crops that are needed in connection with their livestock operations. On other farms, irrigation is the means of growing one or more cash crops -- sugar beets, alfalfa, potatoes, or beans -- in addition to feed crops. On some farms irrigation has been used merely to intensify the type of farming done before irrigation was introduced.

Kinds Of Crops Irrigated -- Feed grains are irrigated in the Mountain states to some extent. In some areas of the Great Plains corn is irrigated. Hay and forage crops are important in most areas, not only as feed, but as rotation crops to maintain soil fertility.

All the cotton grown in Arizona and California is irrigated. Most of the cotton grown in New Mexico and in the western part of Texas is also irrigated. One of the most important cash crops of the western states that depends almost entirely on irrigation is sugar beets.

The irrigated West is especially well adapted to the production of seed crops. The full sun and long continuous dry weather provides almost ideal conditions for the maturing and drying of seeds. In virtually all of the irrigated areas of the west we find some seed production.

Fruits are irrigated to some extent in nearly all counties where irrigation is found. Nearly all of the citrus fruit production of California, Texas and Arizona, is irrigated. Vegetable crops plus potatoes and beans are important in the West only because of irrigation.



Irrigation of pasture land is fast becoming more important to the agricultural economy in many parts of the West. Dairy farmers especially find it advantageous to irrigate pasture in the late

(Continued on back)

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

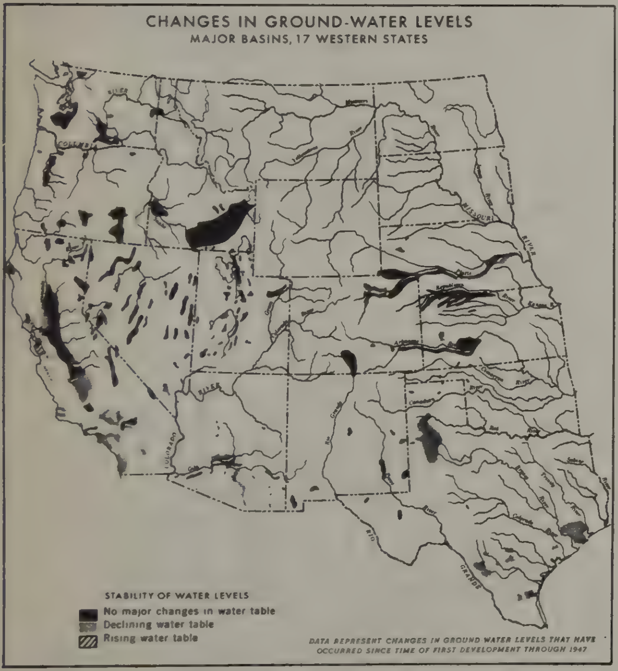
IRRIGATION—PROBLEMS AND POSSIBILITIES

summer season to avoid heavy losses in milk production when their pastures would otherwise dry up. Pasture irrigation can be accomplished by flooding, but many farmers prefer sprinkler systems because they make it possible to improve pastures on rough land with shallow soils.

GROUND WATER RESOURCES

About 10 per cent of the land irrigated in the West obtains the water entirely from ground water sources. Another 10 per cent receives water from the combination of surface and underground water. Outstanding areas that get all of their water from underground sources are located in Kansas, Oklahoma, the High Plains and the Winter Garden and rice areas of Texas.

In many cases the available water supply is used without regard to its limitations. The problem of falling water tables is already acute in many parts of the Southwestern states where pumping has been heavily relied upon to supply water for irrigation.



CHANGES IN GROUND-WATER LEVELS
MAJOR BASINS, 17 WESTERN STATES

STABILITY OF WATER LEVELS
No major changes in water table
Declining water table
Rising water table
DATA REPRESENT CHANGES IN GROUND WATER LEVELS THAT HAVE OCCURRED SINCE TIME OF FIRST DEVELOPMENT THROUGH 1947

An example of an area where the ground water level is declining is the High Plain region of Texas. In the last 10 years the number of irrigation wells has increased fourfold with a corresponding increase in acres irrigated. This water is taken from underground storage but little or no effort is being made to replace it.

The conservation of this water requires proper management of available water and more stringent regulations concerning the use of underground water. Some states such as New Mexico have made great strides toward protecting their underground water resources by enacting strict laws that will insure adequate water supplies for future generations.

SUPPLEMENTAL IRRIGATION

IRRIGATION VS. NON-IRRIGATION—YIELD PER ACRE

CROP	NON-IRRIGATED	IRRIGATED
Kobe lespedeza	200 lbs. seed	700 lbs. seed
Green beans	2 tons	6 tons
Corn - test 1	30 to 40 bu.	60 to 70 bu.
Corn - test 2	Burned up	35 bu.
Cotton - test 1	3/4 bale	1 1/4 bales
Cotton - test 2	250 lbs. lint	525 lbs. lint
Cotton - test 3	1/2 to 2/3 bale	1 bale
Soybeans	10 bu.	19 bu.
Tomatoes	2 tons	7.3 tons
Gr. sorgum (milo)	955 lbs.	2498 lbs.

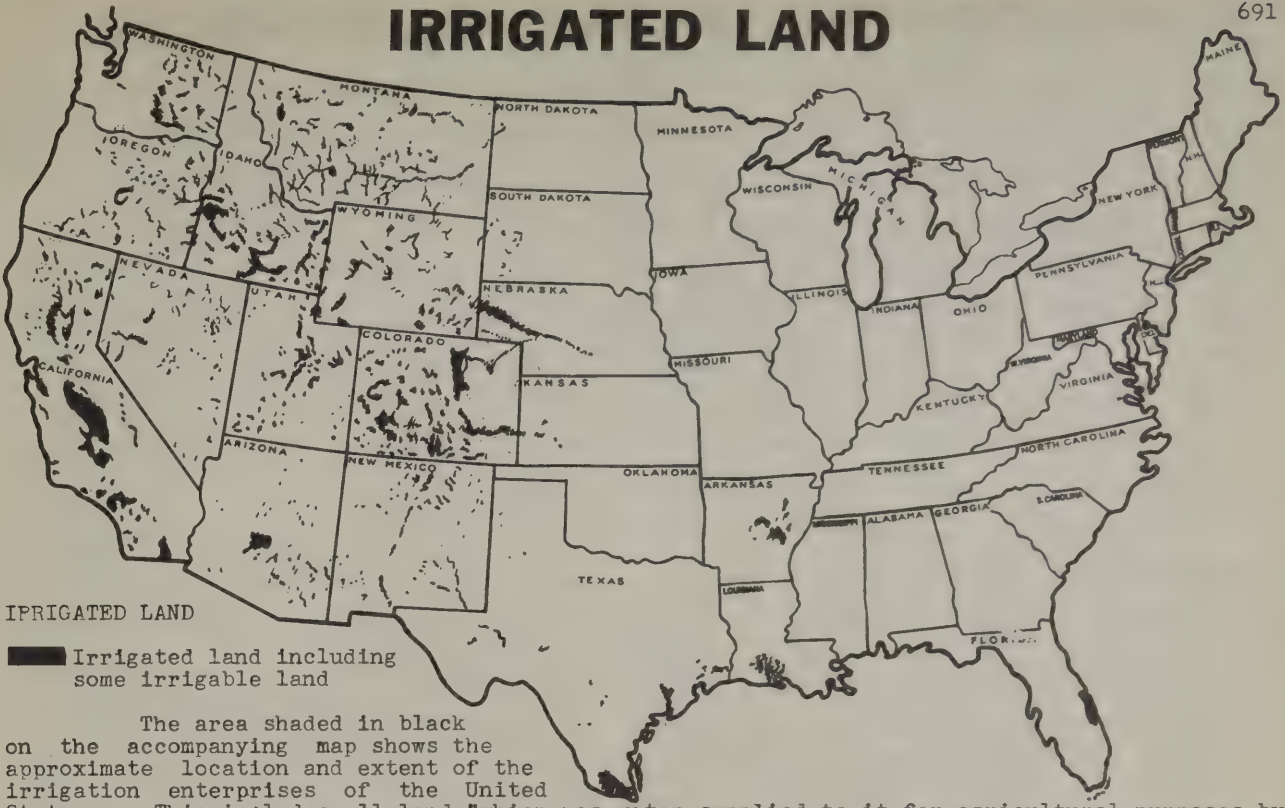
Supplemental irrigation means the watering of crops during dry periods in regions where rainfall is short during certain seasons. Because summer drouth is characteristic of our climate in the Central United States, supplemental irrigation has proved profitable in some years on high income crops like small fruits and vegetables.

Supplemental irrigation, when available, permits a farmer to water his crops to prevent serious set-backs due to drouth. In addition, in areas that are sub-humid, the yield of crops can be greatly increased by supplemental irrigation. The table above shows the difference in yields for various crops in Arkansas and Texas.

It is nearly impossible to estimate the actual cash returns from supplemental irrigation. Some years there will be no profits, but in other years irrigation may save an entire crop. Often it greatly increases profits through heavier yields.

This type of irrigation has been used effectively on small fruit and truck crops, vinous crops as cucumbers, squash and melons, root crops, sweet corn, peas and beans. Some Midwest Colleges have published bulletins on the subject and interest is now high in south Georgia and Florida.

IRRIGATED LAND



IPRIGATED LAND

■ Irrigated land including some irrigable land

The area shaded in black on the accompanying map shows the approximate location and extent of the irrigation enterprises of the United States. This includes all land "which has water supplied to it for agricultural purposes by artificial means or by seepage from canals, reservoirs, or irrigated lands". It also includes all land which is flooded during high-water periods by means of dams, canals, or other artificial methods.

Only the acreage to which water was actually applied in 1929 is included, hence it does not include land under canals and sometimes irrigated unless it was watered in 1929.

The primary acreage of irrigated land is distributed by states as follows:

	Acres	Per Cent of Total Irrigated Land
California	4,746,632	24.3
Colorado	3,393,619	17.4
Idaho	2,181,250	11.1
Montana	1,594,912	8.2
Utah	1,324,125	6.8
Wyoming	1,236,155	6.3
Oregon	898,713	4.6
Texas	798,917	4.1
Arizona	575,590	2.9
Nebraska	532,617	2.7
New Mexico	527,033	2.7
Washington	499,283	2.5
Nevada	486,648	2.5
Louisiana	450,901	2.3
Arkansas	151,787	0.8
Kansas	71,290	0.4
South Dakota	67,107	0.3
North Dakota	9,392	-
Oklahoma	1,573	-
Total	19,547,544	100.0

Although most of the irrigated land is operated under large irrigation districts, there are many small projects frequently confined to one farm.

Most water is supplied by gravity flow or is pumped from streams, but well irrigation is very important in some states and in some areas is the entire source of water. In Texas, 1700 wells are used for irrigation purposes, but these water less than one-tenth of the irrigated land.

The acreage of irrigated land increased about one-third from 1909 to 1919, but only about 350,000 acres during the next ten years to bring the total in 1929 to 19,547,544 acres.

Present enterprises are capable of watering 7,000,000 acres more than that now irrigated. It is estimated that there is sufficient water in the West to irrigate 50,000,000 acres, or about two and one-half times the present irrigated acreage.

Based on Census Data

IRRIGATION PRESENTS SPECIAL PROBLEMS

Irrigation has made possible the development of many productive western crop areas. Most of these would produce little if any crops without having water artificially supplied.

Although these areas are quite small as compared with the total land area, the intensive development and use in many cases of specialized crops has made these irrigation areas highly important in the agriculture of the West. A few acres of irrigated land frequently produce many times the revenue returned from the large areas of surrounding desert and semi-arid lands.

Even though the foregoing is true, the artificial watering of land is sometimes attended with costs and difficulties that either prevent economic operation or if not skillfully handled will greatly reduce the returns that should be secured.

The following summarizes some of the important features to be watched in considering the purchase or operation of irrigated land or acceptance of loans where the primary value is dependent upon successful irrigation.

1. There should be available an adequate supply of water that will not become exhausted with use.
2. There should be a legal right giving full protection,to divert the water.
3. The irrigation system must have pumps, canals, structures, etc., of proper size and in fit condition to carry the water from the river to all land under the canal at all times and without delay.
4. Taxes and water charges must be sufficiently low that the land returns will carry them and leave a proper operating profit.
5. The soil should be uniform and one that can be irrigated and drained satisfactorily.
6. The land surface should have a moderate slope or be so that such grade can be economically established.
7. The irrigated land should be located close enough to main canals and laterals to permit water to be measured and used with the least interference from others.
8. Satisfactory ground water conditions with a convenient drainage outlet are essential.
9. There should be adequate surface drainage.
10. The land should be free from overflow during floods.

Costs of preparing for irrigation are high, averaging about $32.00 per acre in some states. . Water assessments are often $5.00 and more per acre. These high costs continue regardless of poor crops or low prices for farm products.

Successful irrigation enterprises add materially to land values. They also permit diversified and intensive operation, which is the salvation of many farms, ranches, and communities. The foregoing is merely to indicate that not all irrigation is a success,and frequently, many years are required to prove the merits of a new irrigation system or area. Until such areas have undergone years of testing and adjusting, prudent buyers, operators, and investors should proceed with caution.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

WATER SUPPLIES ARE FAILING

Millions of dollars now being invested by farmers, loan companies and businessmen in some areas will be lost when the water supply runs out.

The outstanding example is the irrigation wells that are being installed at such a furious rate under the impetus of war boom prices for farm products.

Costly wells are being put down -- often the investment for well, pump and power equipment is $8,000 or more.
Costly leveling of the land for irrigation must follow -- often $50.00 to $100 per acre is required.
Loans are made on the basis of permanently irrigable land.
Towns are being built or expanded to serve what is presumed to be permanent, highly productive crop lands.
Banks, mercantile establishments, implement houses, public utilities, churches and schools are set up -- usually in permanent buildings at considerable cost -- to serve such lands.

WARNING! -- As the water accumulated through geological ages runs out -- many of these investments must wither and die.

Before you invest, investigate the future of your water supply.

ARIZONA is an illustration. According to the Bureau of Reclamation, unless Colorado River water is brought into Central Arizona, at a high cost, 226,000 acres of highly productive cropland will soon go out of production.

This land is in the general area around Phoenix, where ground water levels have been so lowered through pumping that substantial acreages in the rich valley have already been abandoned for crop use. Unless something is done the desert will reclaim the land -- homes will disappear and towns shrink to desert villages.

The University of Arizona says 350,000 acres, or possibly one-third of all the irrigated land in the state, may revert to desert as the underground water supplies are exhausted.

Since 1920 the trend of the water table in the Salt River Valley has been downward. The water level has declined about 35 feet in Deer Valley since 1942 and about 30 feet since 1930 in the Queen Creek area.

AVERAGE COST OF PUMPING IRRIGATION WATER IN CENTRAL ARIZONA

Pump Lift In Feet	*Cost of Water Per Acre-Foot*
65	$2.53
90	3.18
100	3.44
125	4.09
150	4.74
175	5.39
190	5.78

The effect of a declining ground water level on pumping costs is clearly revealed by the preceding table which shows the relationship between pump lift and cost of pumping water per acre-foot in Central Arizona.

WEST TEXAS is another example. Huge investments are being made, based on highly uncertain water supplies.

Some sections of the High Plains have already been over-developed. The lift in one district has increased 25 per cent since 1938.

The High Plains had 300 wells and 3,500 acres under irrigation in 1934. In 1947 there were 5,500 wells and 650,000 acres under irrigation in this section.

In Lubbock, Texas early this spring farmers were buying as many as 50 irrigation pumps a day. The cost of these pumps and of digging the wells will have to be borne over a period of years -- years when prices are apt to be less than the present 35 cents a pound for cotton and $2.30 a bushel for wheat.

Until recently heavy pumping was confined to relatively small districts surrounded by large areas with little or no irrigation. Now, however, the pumping areas have spread out and there are no major unpumped areas to replenish the underground water. More water is being taken out than gets back in. The water level falls, wells have to be deepened, and the cost of irrigating goes up -- AND UP -- **AND UP**

NEW MEXICO - the Roswell basin, where ground water irrigation has been practiced for many years, was once faced with economic disaster because of a lowering of the water table in the upper

WATER SUPPLIES ARE FAILING

basin and waterlogging in the lower part. The situation was so bad that the Federal Land Bank refused to lend money EXCEPT ON A DRY LAND BASIS.

Laws have now been passed regulating the drilling of wells and the use of underground water, and the situation has been corrected. New Mexico is one of the few states having clearly defined laws relating to pumping from wells for irrigation.

THE GREAT PLAINS - In many new locations irrigation wells are being rapidly installed and land leveled.

NEBRASKA - Irrigation is going forward at a very fast rate. The ground water situation in some areas is good though, due to the nearness of the Sand Hills.

KANSAS - and other Great Plains farmers are installing more well irrigation. It means a realignment of underground waters. Can the drain be maintained -- especially when annual rainfall returns to normal? Will lower-priced farm crops pay for the pumps and the cost of pumping?

CALIFORNIA - The water situation has been critical in all rice areas of the state.

The San Joaquin Valley has been over-developed for irrigation. Heavy withdrawals of water north of Long Beach have caused the water levels to be lowered. The underground water level in Antelope Valley is falling about three feet per year at present. In 1947 the overdraft on underground water in this area was more than 50,000 acre-feet.

As to the water situation in Antelope Valley, the Division of Water Resources of California made the following recommendation to the State Legislature. "As lands go out of production because of economic pressure or from other causes, they should be acquired and held by a properly constituted public agency. Lands sold to the state for taxes should not again be put on the open market. If publicly owned, these lands could still be used under lease or permit, but with cropping and water use restricted." This shows how grave the situation is in that area.

Of the more than 73,000 irrigation wells in this country, more than one-half are in California. Fresno County increased its pumped wells from 2,300 in 1920 to 9,000 in 1940.

ARKANSAS - There has been a great expansion in the number of wells for irrigating rice in the Stuttgart-Forrest City area. Lowering water tables have for years been a cause for concern and some operations now depend entirely on surface water supplies.

WHEN FARM PRICES GO DOWN even a little, some of these new developments will start going out. Declining prices of farm products will quickly put the cost of water out of reach of the farmers' ability to pay.

Steadily lowering water tables are pushing pumping costs higher and higher. In many irrigation areas, the long-time average prices of farm products is not nearly high enough to enable farmers to pay these costs.

Many wells are near the break-even point today, even with rice at $2.50 per bushel, cotton at 35¢, alfalfa at $30.00 per ton, and corn at $2.25 per bushel.

TOWN AND CITY growth is limited in the more acute areas. The short water supply is not enough in some areas to support factories and may even prove inadequate for domestic use.

IF YOU HAVE an investment that is dependent upon irrigation water and there can be any possible questions about the permanency of the supply -- it is time to investigate your position.

BEFORE YOU BUY, LOAN OR INVEST in a business in an area of new or uncertain water developments, get all possible facts from the best informed authorities, such as the Agricultural College, government agents, Soil Conservation Service, U. S. Reclamation Bureau and the State Department of Agriculture.

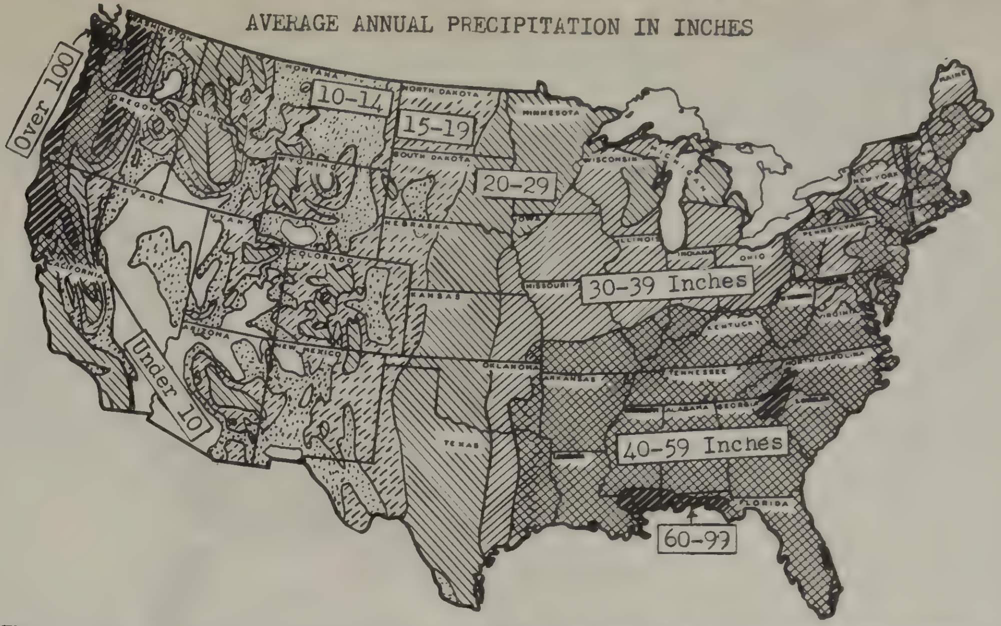
FOR YEARS we have been studying these developments and accumulating data.

The need for releasing these statements was impressed upon us again by a study we have just completed in an area where failing underground water supplies have resulted in a very serious situation.

700 Climate

700 Climate

RAINFALL FREQUENTLY CONTROLS CROPS



The total yearly precipitation tends to vary in a southeast-northwest direction, with a marked swing to an east-west direction moving inland. The highest rainfall recorded in the United States is in Oregon, where in localized areas precipitation exceeds 120 inches per year.

The westerly winds lose most of their moisture along the West Coast as they are cooled when they rise to cross the mountains and then continue inland as drying winds which yield rain only as they are forced to rise again when they cross the Rockies.

East of the Rockies, practically all of the moisture is brought in from the Gulf of Mexico by southern winds. Precipitation then occurs when cyclonic storms develop as a result of cold air moving in from the northwest, which forces the warm air up and cools it so that rain condenses and falls. Summer rains, however, are usually the result of convection currents which carry moisture-laden warm air high into the cool upper air.

Throughout most of the Mississippi Valley and eastward, rainfall is sufficient to support all forms of plant life. The 100 meridian lies roughly along the line of 20-inch rainfall, which in general marks the dividing line between range country and farming country.

Rainfall varies in four important ways:

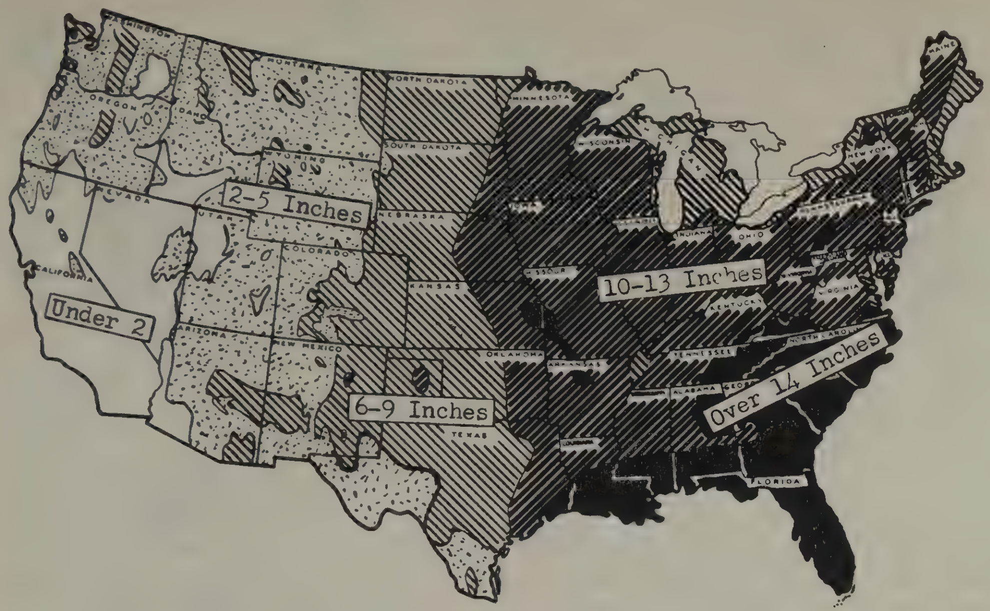
1. Total annual precipitation
2. Distribution
3. Intensity
4. Variation from year to year

While it is not possible here to analyze the rainfall of each state, it will suffice to say that conditions are most favorable to the east and southeast and less favorable to the northwest and west. Rain along the West Coast tends to be winter rain. In the great central plain most of the rain comes during the growing season, but in going westward over the Great Plain summer drouths become more frequent and more enduring until they may actually extend from month to month or year to year. Total precipitation tends to vary in cycles so that several drouth years may be followed by several years of abnormal moisture supplies.

Based on Data of Weather Bureau and U.S.D.A.

SUMMER PRECIPITATION- IS UNDER 10 INCHES FOR MOST OF THE UNITED STATES

Average Summer Precipitation in Inches - July to August, Inclusive



For rapid plant growth, both high temperatures and high rainfall are essential. As already noted, the summer temperatures in all parts of the United States are high enough to support plant growth but moisture is limited in some regions.

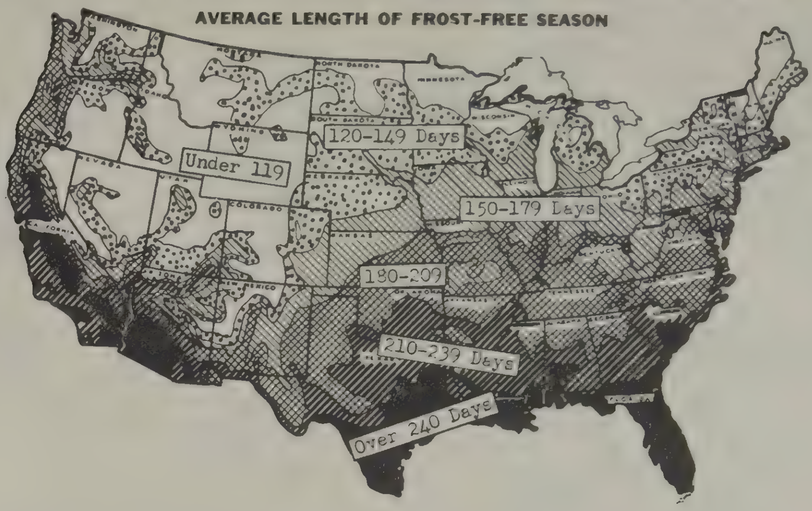
Relatively little rain falls on the West Coast except in high mountains during the summer, and it is not until after crossing the Rockies that summer rain is found to occur regularly. East of a line lying roughly along the 100 meridian, summer rainfall exceeds 10 inches, and in general this is enough to support luxuriant plant growth. Roughly, this line divides the tall and short grass regions and marks the eastern reach of the range country.

The effectiveness of rainfall is not measured entirely by the total. For instance in North Dakota 15 inches may produce as good or better crops than 25 inches in southern Texas due to more torrential rains in the south, more runoff, and greater evaporation.

It is due largely to the fact that a heavy summer rainfall, so conducive to high corn yields, is coupled with dry winter which promotes a grassland vegetation and conserves the soil, that the Upper Mississippi Valley is one of the richest agricultural areas in the world. Farther to the south and east, rainfall becomes excessive and the soils have become eroded and leached through centuries of exposure.

Based on Data of U.S.D.A.

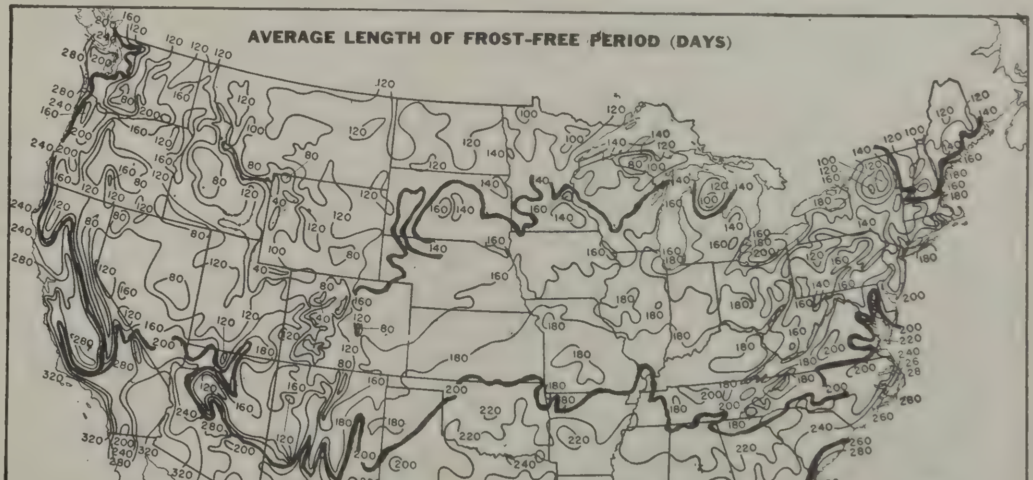
LENGTH OF GROWING SEASON


AVERAGE LENGTH OF FROST-FREE SEASON

For the growth and maturity of any crop, a certain minimum number of growth days are required. Under natural conditions the growing season is determined by the number of days between the last killing frost of spring and the first killing frost of fall. Cotton requires a growing season of about 200 days; corn cannot be successfully grown for grain much beyond the 150-day line; wheat must have about 90 days; and so it is with all crops. The frost-free dates are as important to crop production as average rainfall.

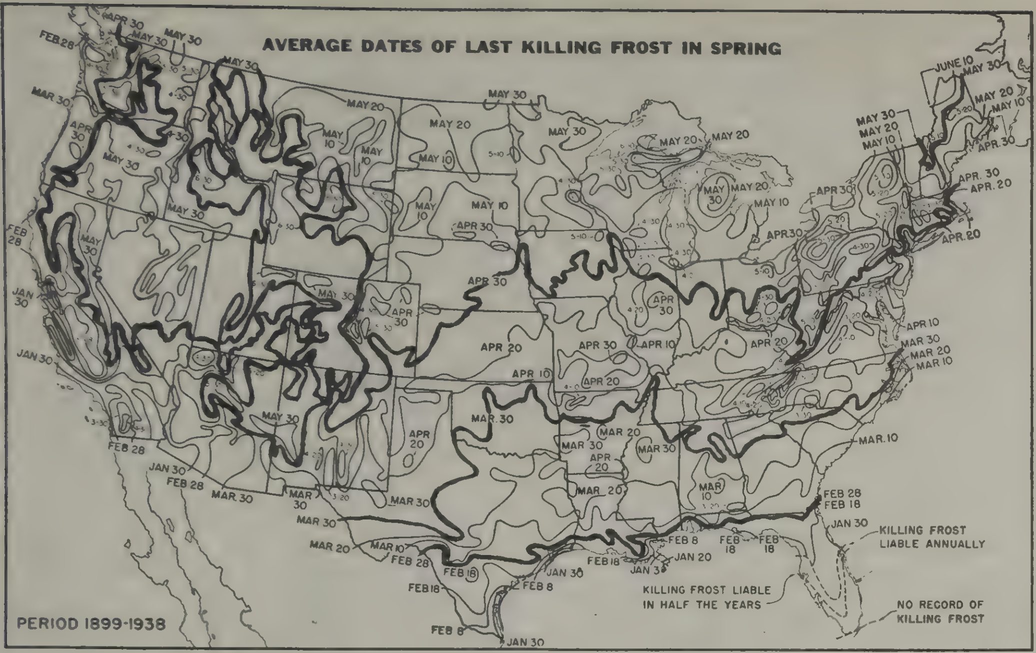
The high altitude of much of the western grazing and irrigated crops belt, and the dry air which permits rapid cooling at night are two important reasons for the short growing season in the West. It should be noted that the Pacific Ocean exerts a powerful influence on the frost-free dates of the West Coast but that the Atlantic Ocean has only a slight effect in lengthening the growing season along the East Coast.

No part of continental United States is entirely free from frost.


AVERAGE LENGTH OF FROST-FREE PERIOD (DAYS)

U.S.D.A. and Weather Bureau

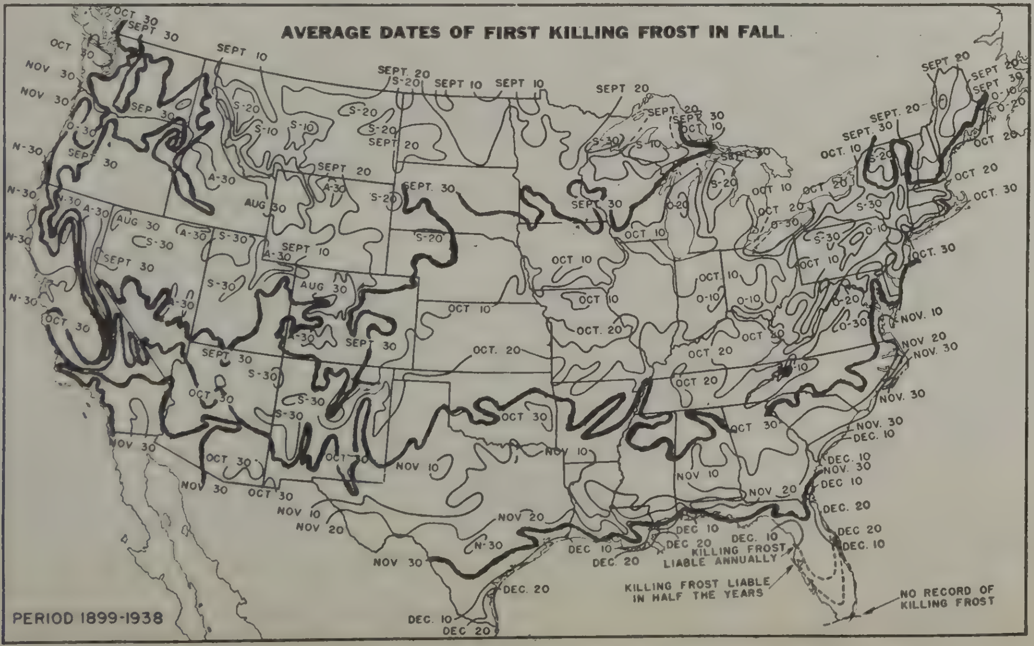
FROST-FREE DATES



The planting and harvesting season of most farm crops are closely related to the frost free dates.

Tender crops like corn and soybeans are planted 10 to 20 days after the average frost free date to avoid possible danger from late frosts. Harvest of most full season crops occurs near or shortly after the first killing frost in the fall.

The first killing frost of the fall determines the practical limit to late planting of crop. When emergencies arise and late planting is necessary provision, should be made to utilize the crop in a way that will reduce this hazard - corn can be cut for silage or fodder, soybeans for hay, and other crops can be utilized for hay, pasture, or forage at a minimum risk.

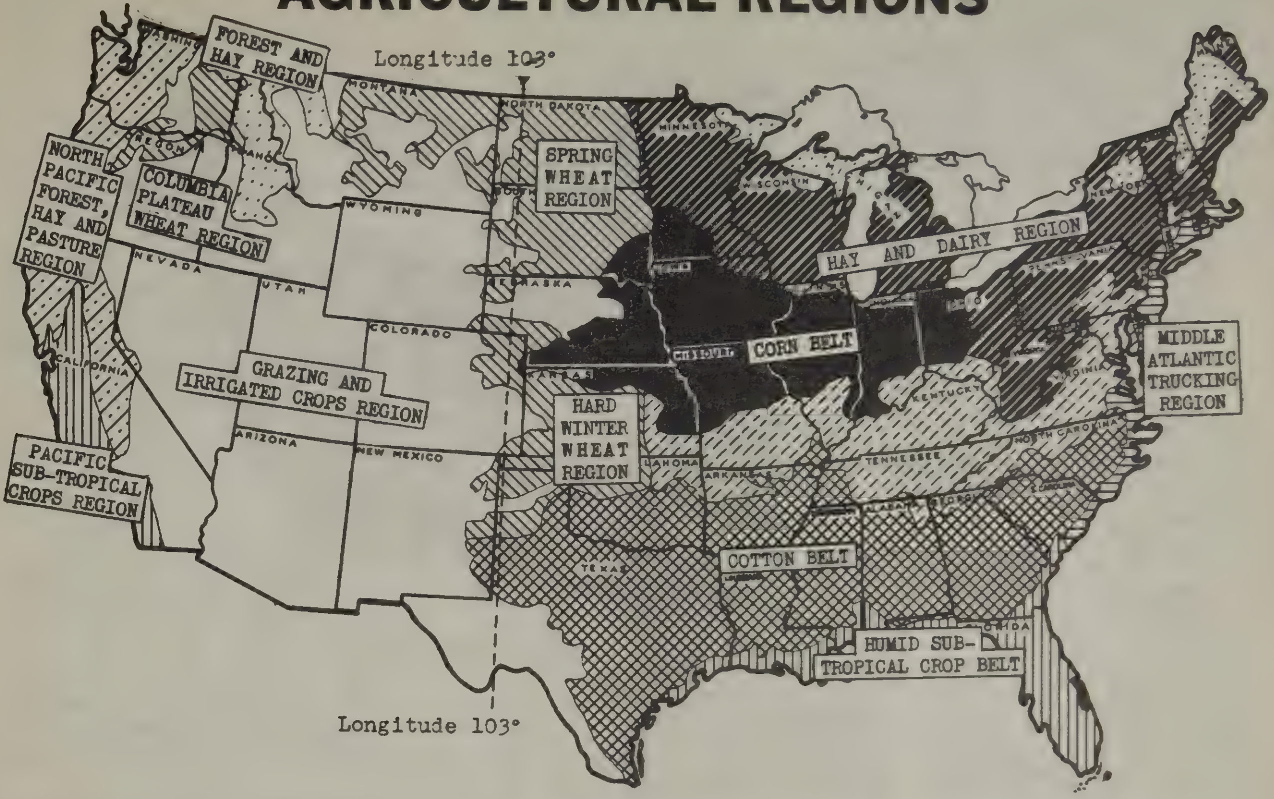

AVERAGE DATES OF FIRST KILLING FROST IN FALL
PERIOD 1899-1938
OCT 30
SEPT 30
SEPT 10
SEPT 20
AUG 30
OCT 10
OCT 20
OCT 30
NOV 10
NOV 20
NOV 30
DEC 10
DEC 20
KILLING FROST LIABLE ANNUALLY
KILLING FROST LIABLE IN HALF THE YEARS
NO RECORD OF KILLING FROST

U.S.D.A. and Weather Bureau

750 Types of Farming

750 Types of Farming

AGRICULTURAL REGIONS



The United States divides into two main parts, the line being approximately at longitude 103° except where there is a trend southeasterly in Texas and northwesterly in Montana.

East of this dividing line is a humid or subhumid climate which separates logically into eight agricultural regions (excluding the forest and hay belt in the extreme north). These regions are differentiated on the basis of the dominance of a certain crop or kind of farming, which is the result primarily of latitude and temperature conditions, and secondarily of soil and other physical features.

West of longitude 103° the climate is arid or semi-arid except in the North Pacific region, parts of the Columbia Plateau, and the higher altitudes in the mountains. This broad expanse of country divides into four regions according to the general use of land for grazing and crops. These regions are primarily determined by altitude and rainfall, with soils and other physical features important factors.

Many physical conditions have combined to determine the geography of American agriculture. These become increasingly important with the commercialization of farming. Improved transportation, and commercial and scientific developments have greatly intensified rather than lessened the influence of physical conditions.

The most important physical conditions affecting agricultural development may be classified into the following four groups:

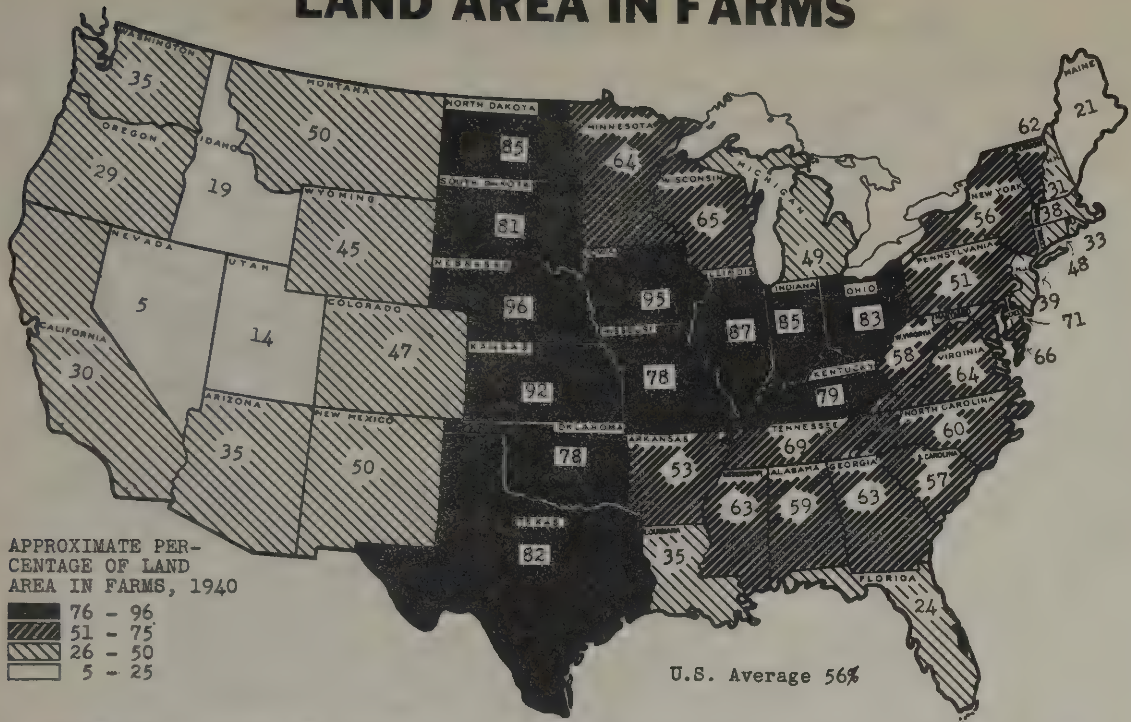
1. Temperature and length of growing season
2. Moisture, or rainfall, and its seasonal distribution
3. Topography, or lay of the land, including the direction and extent of slope
4. Soils

The accompanying map and discussion deal only with the very broad aspects of this subject. Within each major region economic factors, man-made influences, have combined with physical conditions to create numerous types of farming areas, a knowledge of which is essential to an understanding of the agricultural enterprises of any local area.

Based on Data of U.S.D.A.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

LAND AREA IN FARMS



About three-fourths of our farm land lies in the Mississippi Valley. This is in general a level to rolling region between the Appalachian Mountains on the east and the Rocky Mountains on the west.

About three-fourths of the farm land is in the humid and subhumid regions. The remaining fourth is mostly arid, grazing, dry-farming, or irrigated land in the West.

Only a little over half, 55.7 per cent, of the total land area of the United States was in farms in 1940. The use of this acreage was divided as follows:

	Per Cent
Crops (Harvested and failure)	32.2
Crop land, idle and fallow	5.4
Plowable pasture	12.4
Woodland	13.0
All other	37.0
	100.0

The land not in farms is in forests, deserts, bare rock, swamps and tidal marshes, sand dunes, or is being used for cities, parks, roads, and railroads.

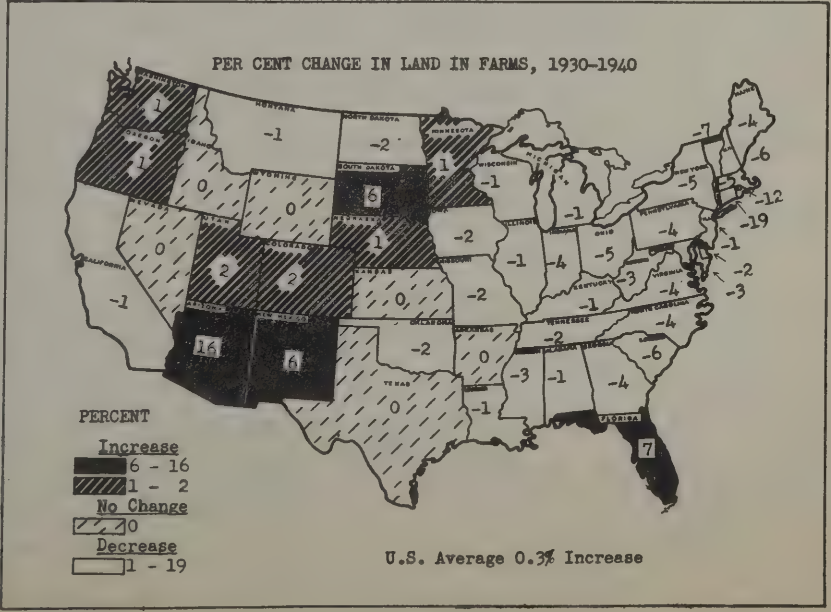
Land use is far from stabilized. The conquest of the West continues. Following the westward march, there is now showing up prominently throughout the eastern half of the nation, farm land abandonment due principally to soil erosion and exhausted fertility. This is strikingly brought out in the map showing the change in farm land from 1930 to 1940.

Most of the increased farm acreage in the West is being used for grazing.

During 1930 to 1935 there was a further increase of 6.4 per cent in the land in farms, much of which resulted from the depression checking the flow of population away from farms, and a stimulation primarily of "subsistence farming". From 1935 to 1940 the increase was .6 per cent or a total of 7 per cent for the decade.

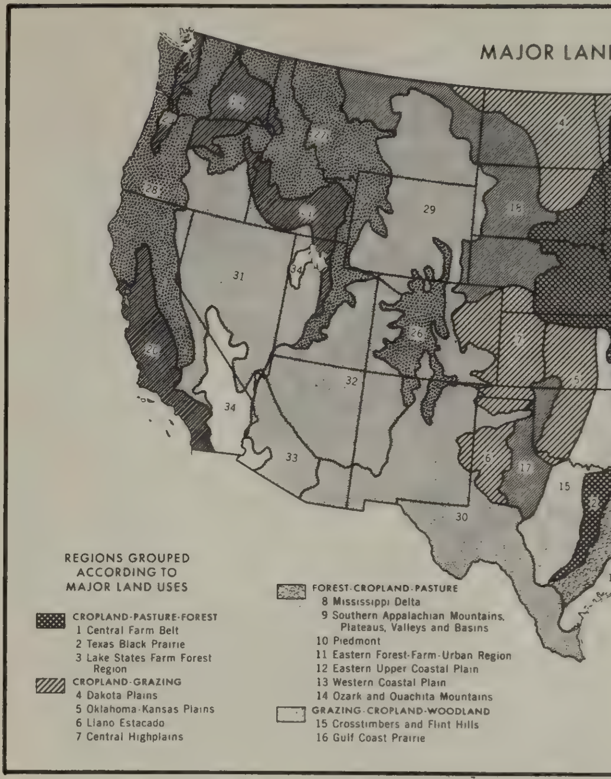
It will no doubt be many years before the nation achieves permanent, stabilized, and adapted land use.

PER CENT CHANGE IN LAND IN FARMS, 1930-1940



1940 Census Data

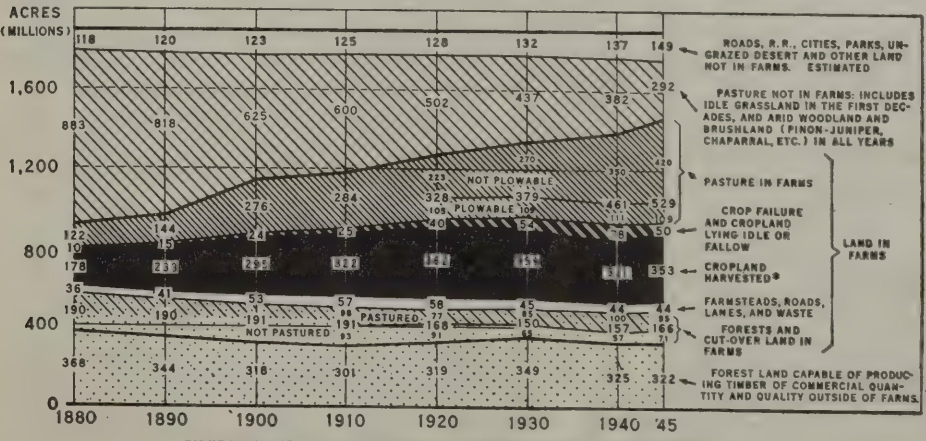
MAJOR LAND USE REGIONS


MAJOR LAND USE REGIONS
REGIONS GROUPED ACCORDING TO MAJOR LAND USES
CROPLAND-PASTURE-FOREST
1 Central Farm Belt
2 Texas Black Prairie
3 Lake States Farm Forest Region
CROPLAND-GRAZING
4 Dakota Plains
5 Oklahoma-Kansas Plains
6 Llano Estacado
7 Central Highplains
FOREST-CROPLAND-PASTURE
8 Mississippi Delta
9 Southern Appalachian Mountains, Plateaus, Valleys and Basins
10 Piedmont
11 Eastern Forest-Farm-Urban Region
12 Eastern Upper Coastal Plain
13 Western Coastal Plain
14 Ozark and Ouachita Mountains
GRAZING-CROPLAND-WOODLAND
15 Crosstimbers and Flint Hills
16 Gulf Coast Prairie
GRAZING-CROPLAND
17 Redbeds and Gypsum Plains
18 Northern Highplains
GRAZING-IRRIGATED AND DRY CROPLAND-WOODLAND
19 Columbia Basin
20 Pacific Valleys and Southern California Coastal Regions
21 Snake River Plains and Utah Valley
FOREST PASTURE-HAYLAND
22 Northeastern Forest Region
23 Lake States Cut-over Region
FOREST-GRAZING-CROPLAND
24 Atlantic and Gulf Coast Flatwoods
25 Florida Peninsula
FOREST-GRAZING-HAYLAND
26 Southern Rockies
27 Northern Rockies and Utah Mountains
28 Sierra-Cascade Forest Belt
GRAZING-WOODLAND IRRIGATED CROPLAND
29 Arid Highplains
30 Rio Grande Plateaus and Plains
31 Intermountain Basin
32 Colorado Plateaus
33 Southern Arizona
MOSTLY UNUSED
34 Desert

The use to which land is put depends on economic and social changes as well as the physical and climatic factors bearing upon the land itself.

During and immediately following World War I, the last major land frontiers were opened up. The depression and the drouths of the middle 30's forced some abandonment of marginal farm land.

Government farm programs, which came in during the middle and late 30's, tended to freeze land use according to historic patterns. With the coming of World War II, most government restrictions on land use were temporarily lifted and the land has been farmed hard ever since. It is expected that renewed government control programs will force a gradual shift to more conservative practices by 1950 or '51. Wartime shifts in agriculture will be permitted to modify the historic pattern of land use to some extent under the new government programs



FIGURES PRIOR TO 1930 ARE MOSTLY ESTIMATES BASED ON THE CENSUS
**CROPLAND ACREAGES ARE FOR THE YEAR PRECEDING THE DATE OF THE CENSUS*

TREND IN LAND UTILIZATION, UNITED STATES, 1880-1945.

Notable shifts have occurred in the use of land since 1880. Total land in farms, in crops, and in pasture has increased generally in the West, whereas there have been decreases in land in farms in many parts of the East.

The map which shows Major Land Use Regions should be studied in relation to the type of farming maps in this chapter.

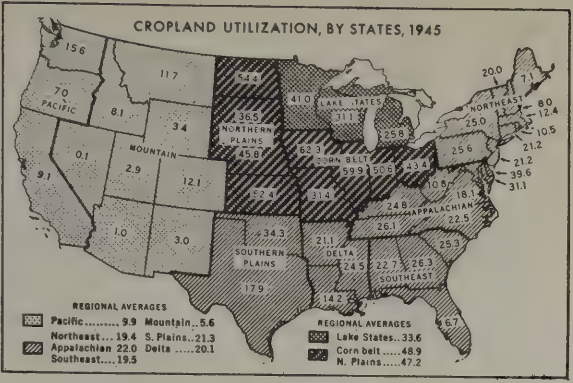
Source - USDA, BAE.

LAND USE IN THE UNITED STATES

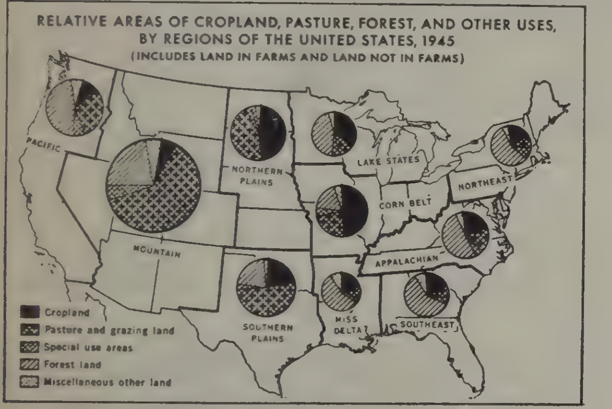
Agricultural uses of the land in the United States are principally three—pasture, crops, and forest. . . . In 1945, cropland amounted to about 403 million acres (cropland harvested, crop failure, and cropland idle or fallow). Mechanization, increased use of fertilizer and lime, adoption of improved crop varieties (such as hybrid corn), the concentration of cropping onto the better farms and better fields, and favorable weather, have all helped in achieving the present high level of crop production on a cropland acreage that has remained relatively stable for several decades.

In contrast, the area used for pasture and grazing is by far the largest single item of land use and involves about 1,052 million acres, or 55 percent of the land. Included are 707 million acres of nonforested pasture and grazing land and 345 million acres of grazed forest land. Thus, there are 2.6 acres of pasture and grazing land for each acre of cropland. In general, the productivity per acre of pasture and grazing land for crops is much lower than that of cropland now in use and large areas are grazed as the only feasible use; however, in total, it is a noteworthy element of the total agricultural industry and supplies more than one-third of the feed for all livestock.

In 1945, 1,142 million acres were reported in farms by the Agricultural Census. Of this, 529 million acres were open pasture; 403 million acres, cropland; woodland, 166 million acres; and other land, such as farmsteads, roads, and odd spots, 44 million acres. In addition to the land in farms used for agriculture, 178 million acres of open or nonforested pasture and 250 million acres of forest land were grazed outside the farms. In all, approximately 1,570 million acres are used in agricultural production.



Less than one-quarter of the total land area of the United States was reported as cropland in farms in 1945. About 63 percent was concentrated within 37 percent of the land area comprised by the North Central States, Oklahoma, and Texas. The Western States occupied two-fifths of the area but contained only one-eighth of the cropland. Texas, with the largest acreage of cropland, had less than one-fifth of its total area in this category. Iowa, the fourth State in cropland, had more than three-fifths of its total area in cropland. More than half the total in the five States of Iowa, Illinois, Indiana, North Dakota, and Kansas was cropland.



Total acreage in agriculture varies greatly between regions. For example, about 50 percent of the Corn Belt and northern Great Plains States is cropland, while in the Northeast and Southeast about 20 percent is cropland, and in the Mountain and Pacific States less than 10 percent. Grazing land, woodland, and forests are inseparable from arable farming over immense areas. The grazing land lying outside farms, both open and forested, supplements land in farms and is used interchangeably with them every year. Altogether, 1,570 million acres, or 82 percent of the total land area, were used for agricultural production in 1944.

LAND USED FOR AGRICULTURE

"Land used for agriculture"—as measured by the area in farms plus nonfarm pasture and range land—is more than 82 percent of the land area in the country. If timber production on ungrazed forest land outside farms is included as agricultural production, the combined uses—farm land, plus nonfarm pasture and timberland—occupy 1,756 million acres, or about 92 percent of the land area, of which 1,712 million acres are devoted to crops, pasture, and timber, and the remainder is miscellaneous other land in farms.

The rest of the land, 149 million acres, is not used for agriculture or forestry. Included are 15 million acres of high-value urban land and 56 million acres in parks, game refuges, highways, railroads, military reservations, and similar special-use areas outside farms. Included also are 78 million acres located outside farms; they are principally desert, rock, high mountain peak, sand dune, and similar lands having low surface-use value for agriculture, except for wildlife, recreation, or watersheds.

The country can be divided agriculturally into two main parts—the East and the West—on the basis of the physical factors and prevalent use of the land, whether for crops or for pastures. The dividing line approximates longitude 100° and the 20-inch-and-above precipitation zone, except that it trends southeasterly in Texas and northwesterly in North Dakota. The East has mostly a humid or subhumid climate; the West has an arid or semiarid climate, except in the North Pacific region, parts of the Columbia Plateau, and at the higher altitudes in the mountains. The East is divided also into regions on the basis of the dominance of a kind of farming, which is mostly the result of latitude and temperature conditions. The West is divided into regions on the basis of the use of the land for grazing or crops, which is determined largely by altitude and rainfall.

It is estimated that about 10 percent of the land in the United States lies at an elevation of 6,000 feet or more above sea level, about 33 percent is located at elevations of 2,000 to 5,999 feet, and the remaining 57 percent has an elevation of less than 2,000 feet.

As the elevation increases temperatures tend to be lower and growing seasons to be shorter in all regions. For nearly all of the land located above 6,000 feet, the frost-free season is reduced to an average of about 90 days or less; only in the Southwestern States is it somewhat longer. Most of the land above 6,000 feet is rugged and mountainous, suitable mainly to grazing and timber production. Some land in intermountain basins is more level but is adapted chiefly to grazing. Such high land used for the more hardy crops is confined to the most favorable locations and the total is comparatively small.

In the Great Plains and Mountain States, the average annual precipitation decreases from about 35 inches in the Eastern Plains to less than 10 inches in the West, and makes all of the transition from a humid to an arid climate. The amount and distribution of precipitation and the range and distribution of temperatures are very influential in plant growth and use of the land.

The area having average annual precipitation of less than 20 inches is estimated at about 740 million acres. This area is arid to subhumid, depending on temperature and evaporation. Irrigation is necessary for farming in the more arid areas. With precipitation near the upper limits of this class, dry-land farming is practiced, but the drought hazard generally is great and summer fallowing of land is common. Here, latitude, elevation, and wind velocities create marked regional and local differences in productivity. About 40 percent of the land in the United States is markedly deficient in precipitation. Additional areas, located in both the West and the East, are subject to drought of lesser intensity and frequency.

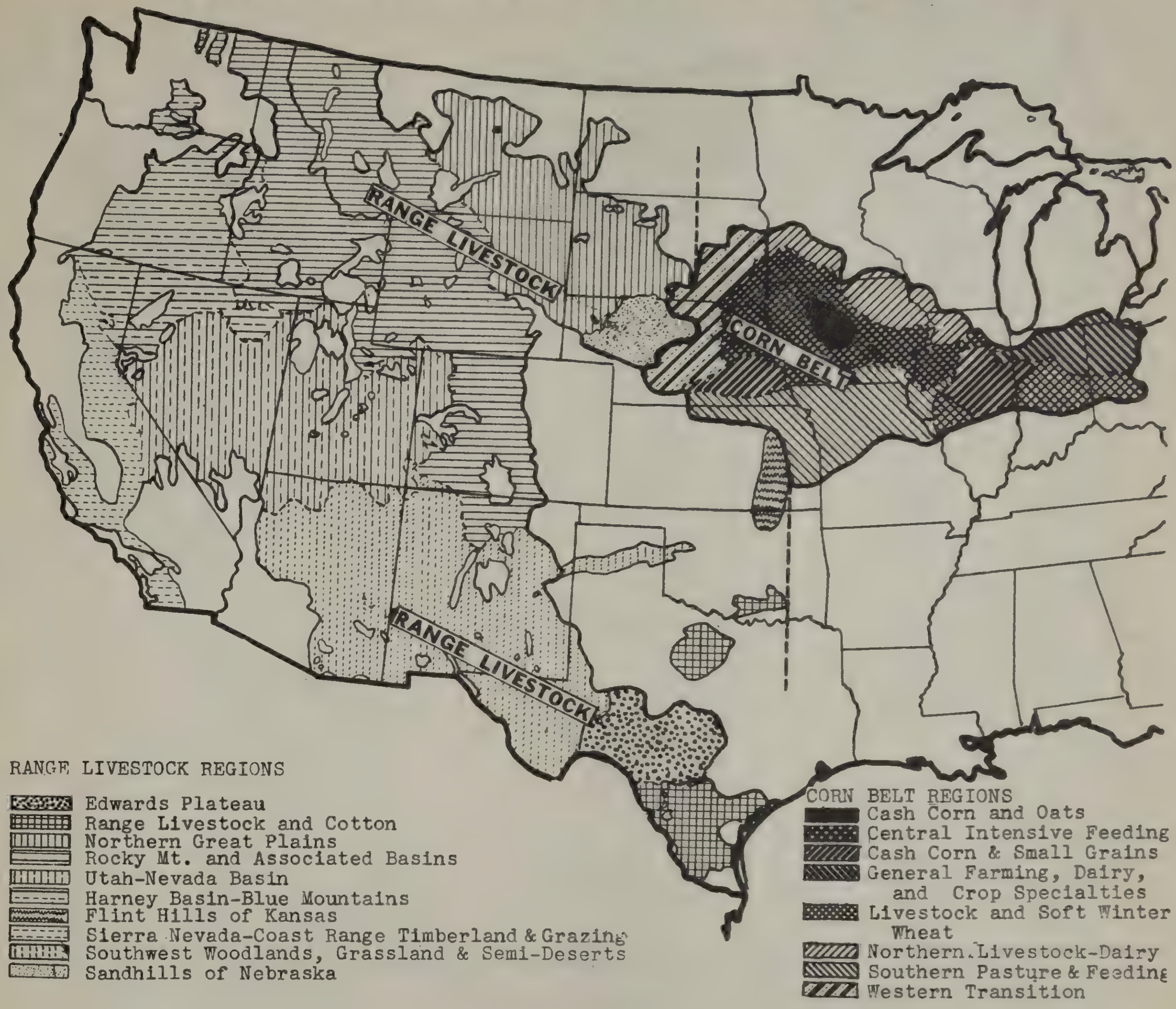
FUTURE LAND USE

Over a series of years, farmers and ranchers tend to make first those changes in land use and in methods and practices that appear to them to be most profitable, consistent with their technical and financial abilities and their beliefs concerning individual and national needs, such as their need for current income, the need for food and other products, and the need for permanent maintenance of soil resources.

With the use of good conservation methods about 360 million acres of our present cropland and 100 million acres of land now in plowable pasture or in need of clearing, irrigation, or drainage could be safely used as cropland. An additional 50 million acres is classified as suitable for occasional cultivation, provided some improvements are made and conservation practices are used to prevent rapid soil losses.

Selected from MISC. Publication 663-USDA

RANGE LIVESTOCK AND CORN BELT


RANGE LIVESTOCK
CORN BELT
RANGE LIVESTOCK
RANGE LIVESTOCK REGIONS
Edwards Plateau
Range Livestock and Cotton
Northern Great Plains
Rocky Mt. and Associated Basins
Utah-Nevada Basin
Harney Basin-Blue Mountains
Flint Hills of Kansas
Sierra Nevada-Coast Range Timberland & Grazing
Southwest Woodlands, Grassland & Semi-Deserts
Sandhills of Nebraska
CORN BELT REGIONS
Cash Corn and Oats
Central Intensive Feeding
Cash Corn & Small Grains
General Farming, Dairy, and Crop Specialties
Livestock and Soft Winter Wheat
Northern Livestock-Dairy
Southern Pasture & Feeding
Western Transition

The Corn Belt is the agricultural heart of the United States. Here grain production is heavy, large numbers of meat animals are grown and fed, and many other farm commodities are produced.

The Corn Belt is the result of level, deep, warm, black soils, rich in lime, nitrogen, and organic matter. The rainfall and temperature are ideal for corn, which requires high day temperatures, relatively warm nights, and regular rainfall during the growing season.

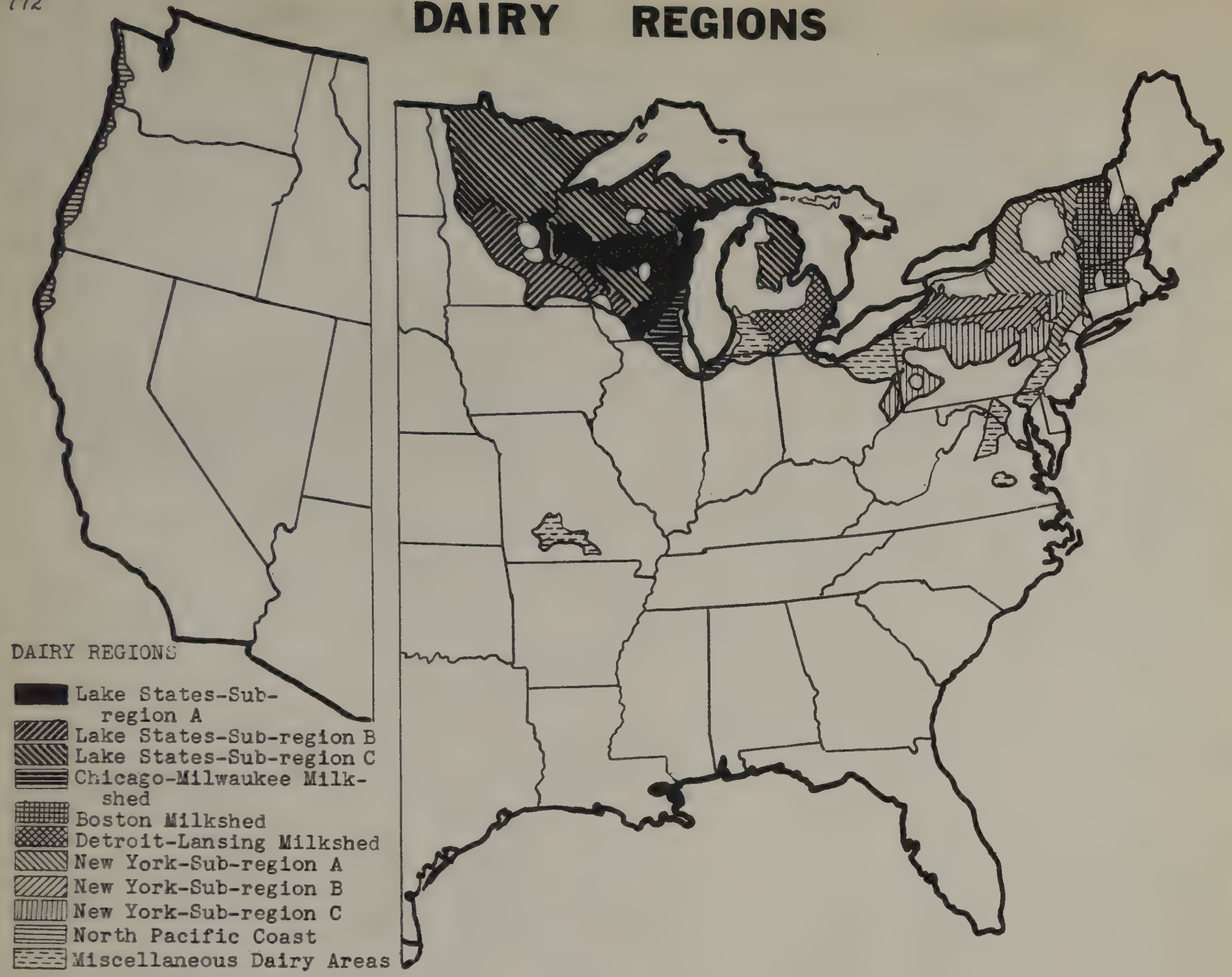
Only about 5 per cent of the corn of the area is commercially processed. The rest is fed to livestock of various kinds. Much of the livestock to which the corn is fed is shipped in from the range livestock areas in the West and Southwest.

Thus the broad expanses of range land are complementary to the Corn Belt. Each definitely contributes to the welfare of the other. Cattle and sheep produced on the cheap grazing land tend to move into the Corn Belt for feeding and finishing, and then move to the consuming centers farther east.

Much of the corn and other feed grains of the Corn Belt also reaches consumers in the form of milk, butter, cheese, poultry, and eggs.

Based on Data of U.S.D.A.

DAIRY REGIONS



Dairying has developed mainly along the Great Lakes and in the Middle Atlantic and New England states. The reasons for this localization are many:

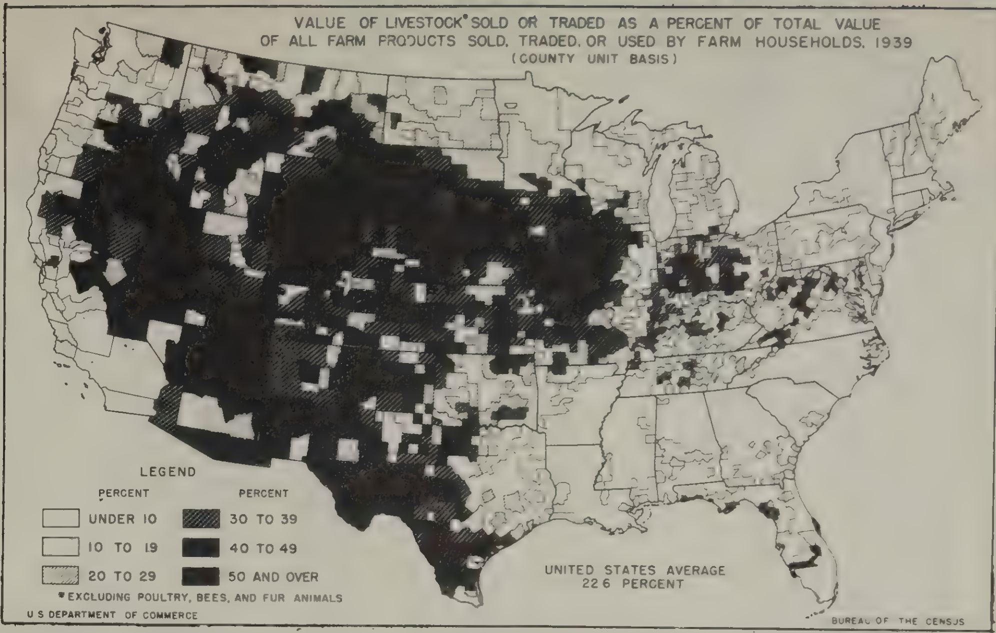
1. The climate is too cool for corn and too moist for wheat. The result is an abundance of hay and pasture with relatively little concentrated feeds.
2. The land is rough and hilly in many districts, preventing the use of power machinery and causing the land to be divided up into many small individual fields and holdings.
3. Nearness to population centers insures a demand for dairy products.
4. Nearness to the Corn Belt insures a continued feed supply.

The Dairy region is largely a result of the interplay of these four major features.

Localized dairying has grown up around practically every town in the nation to supply local demands. Other localized areas are found in the Ozarks and along the Pacific Coast when unusual conditions give dairying an advantage over other systems of farming.

Based on Data of U.S.D.A.

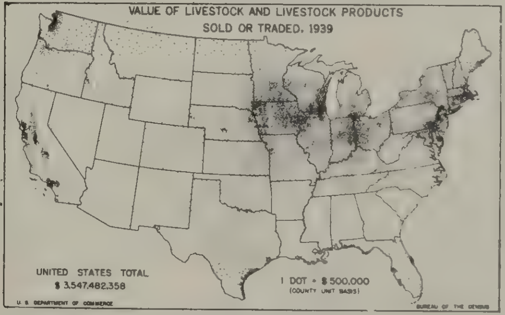
RANCHES AND LIVESTOCK SPECIALTY FARMS

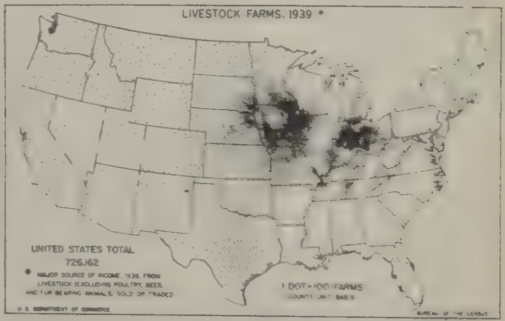

VALUE OF LIVESTOCK* SOLD OR TRADED AS A PERCENT OF TOTAL VALUE
OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS, 1939
(COUNTY UNIT BASIS)
LEGEND
PERCENT
UNDER 10
10 TO 19
20 TO 29
PERCENT
30 TO 39
40 TO 49
50 AND OVER
* EXCLUDING POULTRY, BEES, AND FUR ANIMALS
UNITED STATES AVERAGE
22.6 PERCENT
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

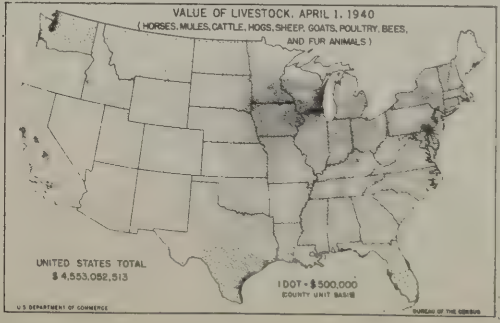
Livestock is relatively most important in the corn belt and throughout such of the great Plains and the Western Mountain regions.

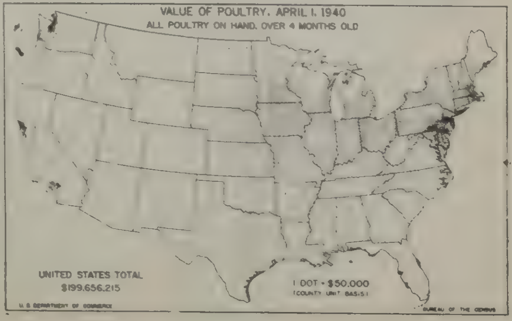
The relative importance of cattle in the great Plains and Mountain regions is largely due to the fact that cattle can graze over vast stretches of subhumid to semi-arid pasture lands where crops are only partly adapted, if they can be grown at all. Severe and prolonged drouths are frequent in these regions and heavy liquidation of the starving cattle occur in some part of the region nearly every year.

The relative importance of livestock in the corn belt is due to the high concentration of grain consuming animal units. Livestock of all classes is produced or shipped into the region and finished for the consumer markets of the industrial regions to the north and east. This is one of the most highly favored agricultural regions of the world and a very stable type of farming has developed.

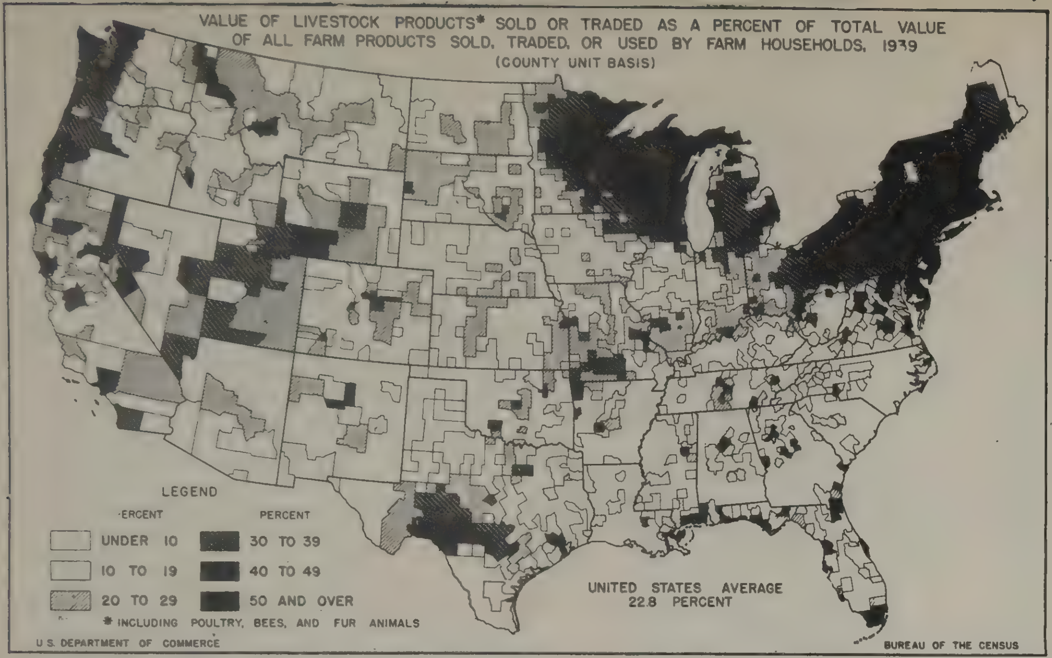



LIVESTOCK FARMS, 1939 *
UNITED STATES TOTAL
726,162
* MAJOR SOURCE OF INCOME, 1939, FROM LIVESTOCK (EXCLUDING POULTRY, BEES, AND FUR BEARING ANIMALS) SOLD OR TRADED
1 DOT = 100 FARMS
COUNTY UNIT BASIS
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


VALUE OF LIVESTOCK, APRIL 1, 1940
(HORSES, MULES, CATTLE, HOGS, SHEEP, GOATS, POULTRY, BEES, AND FUR ANIMALS)
UNITED STATES TOTAL
$ 4,553,052,513
1 DOT = $ 500,000
(COUNTY UNIT BASIS)
U S DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS


VALUE OF POULTRY, APRIL 1, 1940
ALL POULTRY ON HAND, OVER 4 MONTHS OLD
UNITED STATES TOTAL
$199,656,215
1 DOT = $50,000
(COUNTY UNIT BASIS)
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

LIVESTOCK PRODUCTS SPECIALTY FARMS


VALUE OF LIVESTOCK PRODUCTS* SOLD OR TRADED AS A PERCENT OF TOTAL VALUE OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS, 1939
(COUNTY UNIT BASIS)

* INCLUDING POULTRY, BEES, AND FUR ANIMALS

U.S. DEPARTMENT OF COMMERCE

BUREAU OF THE CENSUS

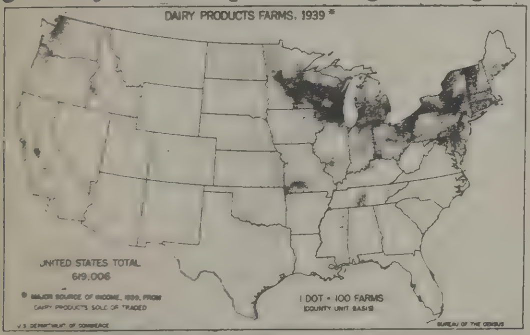
Livestock products specialty farms tend to be highly concentrated in rather restricted areas.

Dairy farming is the most important of this class of farms. The highest concentration occurs in the northern and northeastern dairy belt.

Poultry and poultry product farms are of next importance. Poultry farms are widely scattered throughout the nation but the highest concentration occurs in the east.

Sheep herding is a major enterprise in central Texas and in certain sections of the Mountains and Northwest Pacific states.

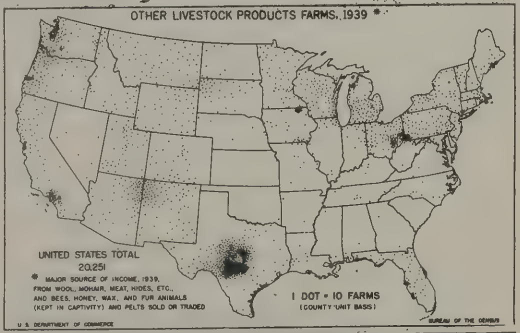
The northeastern dairy region particularly is highly dependent on the corn belt for its feed concentrates. When midwest crops are short or feed prices advance rapidly, production and net income fall rapidly. The Texas sheep region, which is one of our primary sources of domestic wool, is subject to frequent and often prolonged drouth which sometimes forces wholesale liquidation. The poultry industry is concentrated mostly in feed deficit areas and profits fluctuate greatly as the price of grains goes up or down in the grain belts.


DAIRY PRODUCTS FARMS, 1939 *

* MAJOR SOURCE OF INCOME, 1939, FROM DAIRY PRODUCTS SOLD OR TRADED

U.S. DEPARTMENT OF COMMERCE

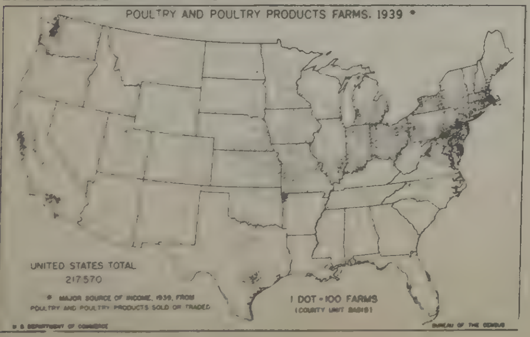
BUREAU OF THE CENSUS


OTHER LIVESTOCK PRODUCTS FARMS, 1939 *

* MAJOR SOURCE OF INCOME, 1939, FROM WOOL, MOHAIR, MEAT, HIDES, ETC., AND BEES, HONEY, WAX, AND FUR ANIMALS (KEPT IN CAPTIVITY) AND PELTS SOLD OR TRADED

U.S. DEPARTMENT OF COMMERCE

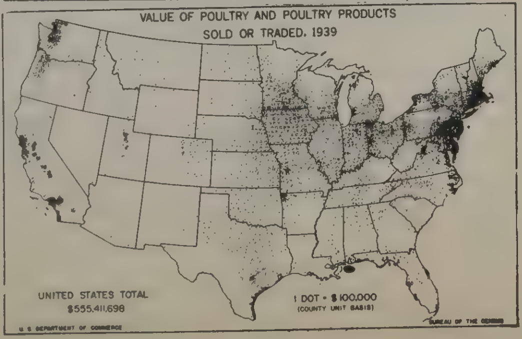
BUREAU OF THE CENSUS


POULTRY AND POULTRY PRODUCTS FARMS, 1939 *

* MAJOR SOURCE OF INCOME, 1939, FROM POULTRY AND POULTRY PRODUCTS SOLD OR TRADED

U.S. DEPARTMENT OF COMMERCE

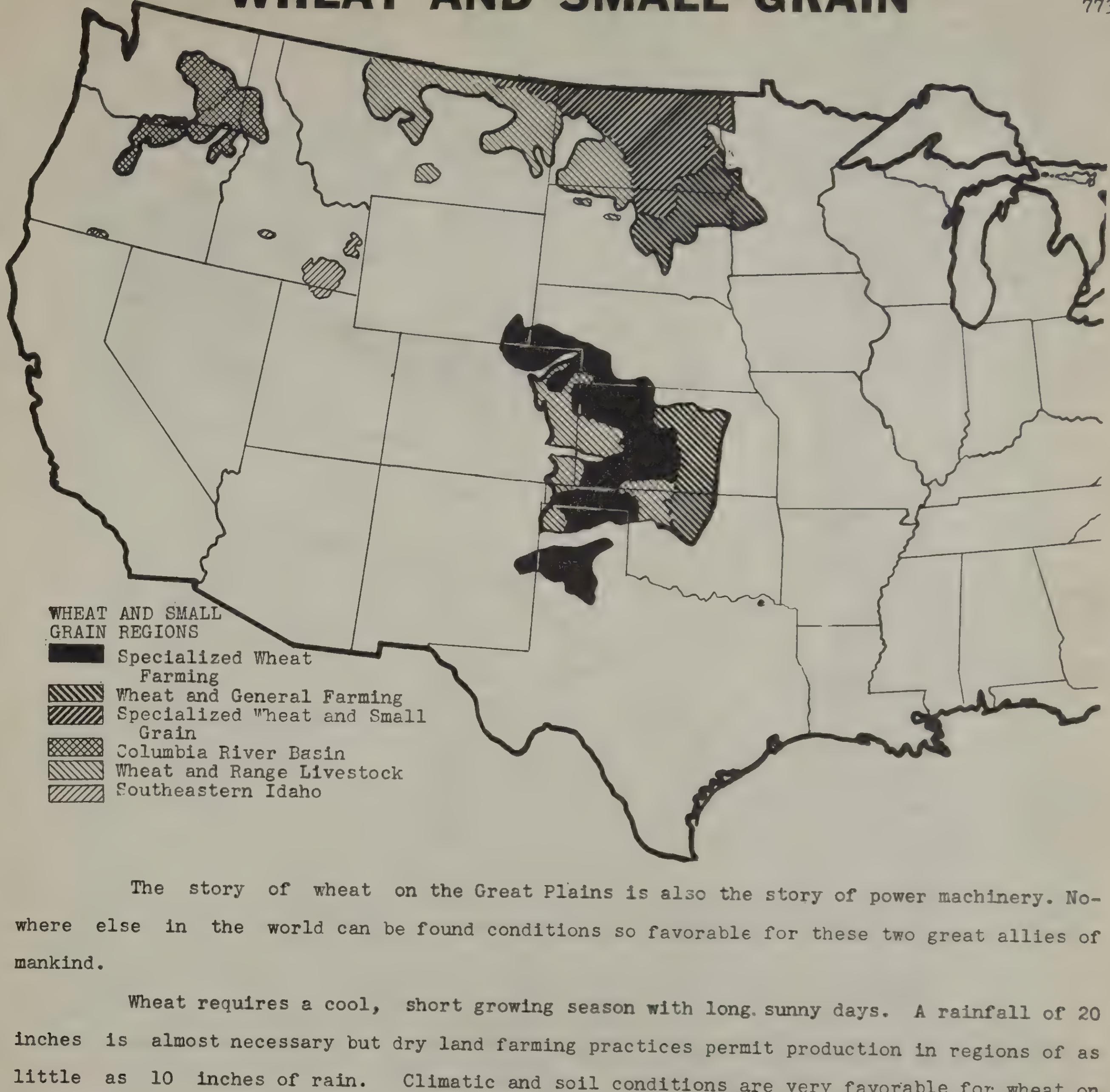
BUREAU OF THE CENSUS


VALUE OF POULTRY AND POULTRY PRODUCTS SOLD OR TRADED, 1939

U.S. DEPARTMENT OF COMMERCE

BUREAU OF THE CENSUS

WHEAT AND SMALL GRAIN


WHEAT AND SMALL GRAIN REGIONS
Specialized Wheat Farming
Wheat and General Farming
Specialized Wheat and Small Grain
Columbia River Basin
Wheat and Range Livestock
Southeastern Idaho

The story of wheat on the Great Plains is also the story of power machinery. Nowhere else in the world can be found conditions so favorable for these two great allies of mankind.

Wheat requires a cool, short growing season with long sunny days. A rainfall of 20 inches is almost necessary but dry land farming practices permit production in regions of as little as 10 inches of rain. Climatic and soil conditions are very favorable for wheat on the plains.

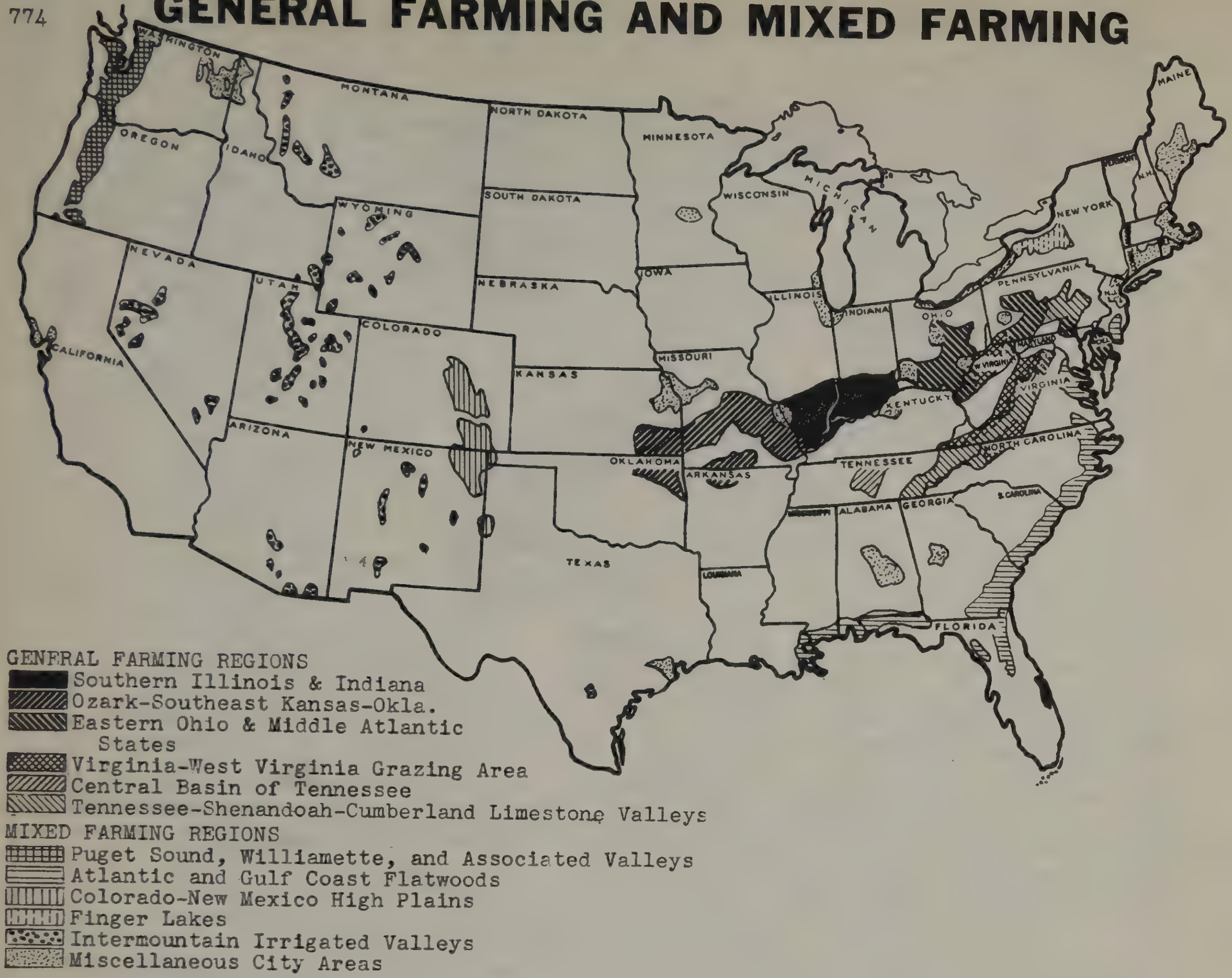
There are three great regions:

1. The Hard Red Winter Wheat region of Kansas and neighboring states,
2. The Hard Red Spring Wheat region of the Dakotas which extends on into Canada,
3. The Palouse Club Wheat region on the Columbia River.

Associated with wheat are found such small grains as flax, and less extensively, oats, barley, and rye.

Based on Data of U.S.D.A.

GENERAL FARMING AND MIXED FARMING



The general farming areas are regions of transition between the Cotton Belt in the south and the Corn and Dairy areas to the north. No one type of farming is dominant, for many crops and classes of livestock have about equal advantage.

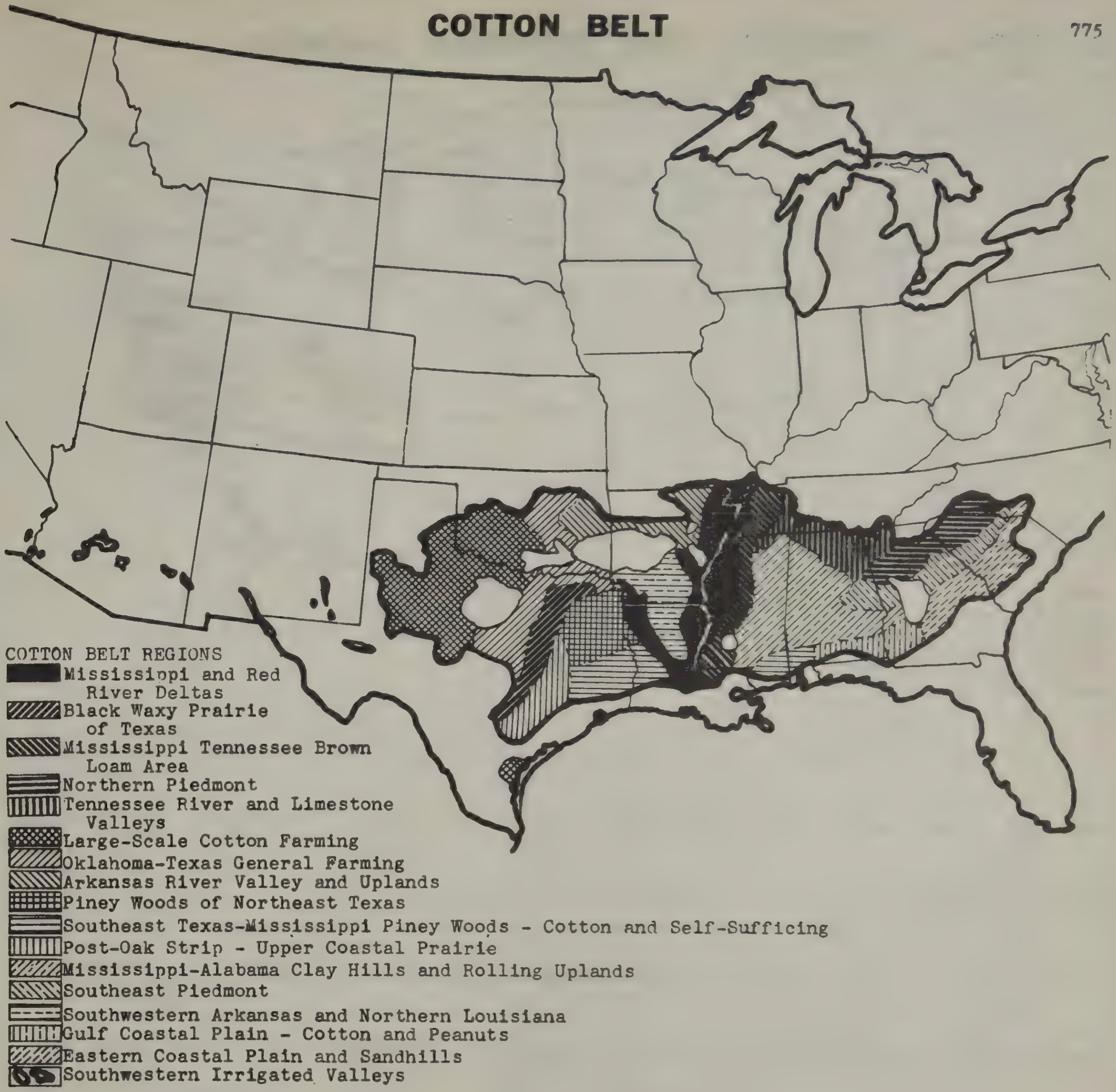
The typical farm is one which grows a few acres of nearly all crops adapted in the region, including corn, wheat, oats, hay, and to a smaller extent, many minor crops. On such farms will be found small numbers of chickens, hogs, sheep, and a few dairy or beef cows. Such farms are typically operated by a small landowner, and the standard of living is likely to be low.

The Mixed Farming areas differ from the general farming areas in that any given farm may be a beef-feeding unit, its neighbor a grain farm, another in the community a vegetable farm, another a dairy, and so on. In other words, the farms are mixed up in the community instead of each farm having a mixture of enterprises as in the general farm.

Mixed farming areas tend to be localized around all of the larger cities, but other regions such as the Atlantic and Gulf Flatwoods areas, the Finger Lake region of New York, the High Plains of Colorado and New Mexico, the Puget Sound district of Washington and Oregon, and many irrigated valleys, are important regions falling under this classification.

Based on Data of U.S.D.A.

COTTON BELT

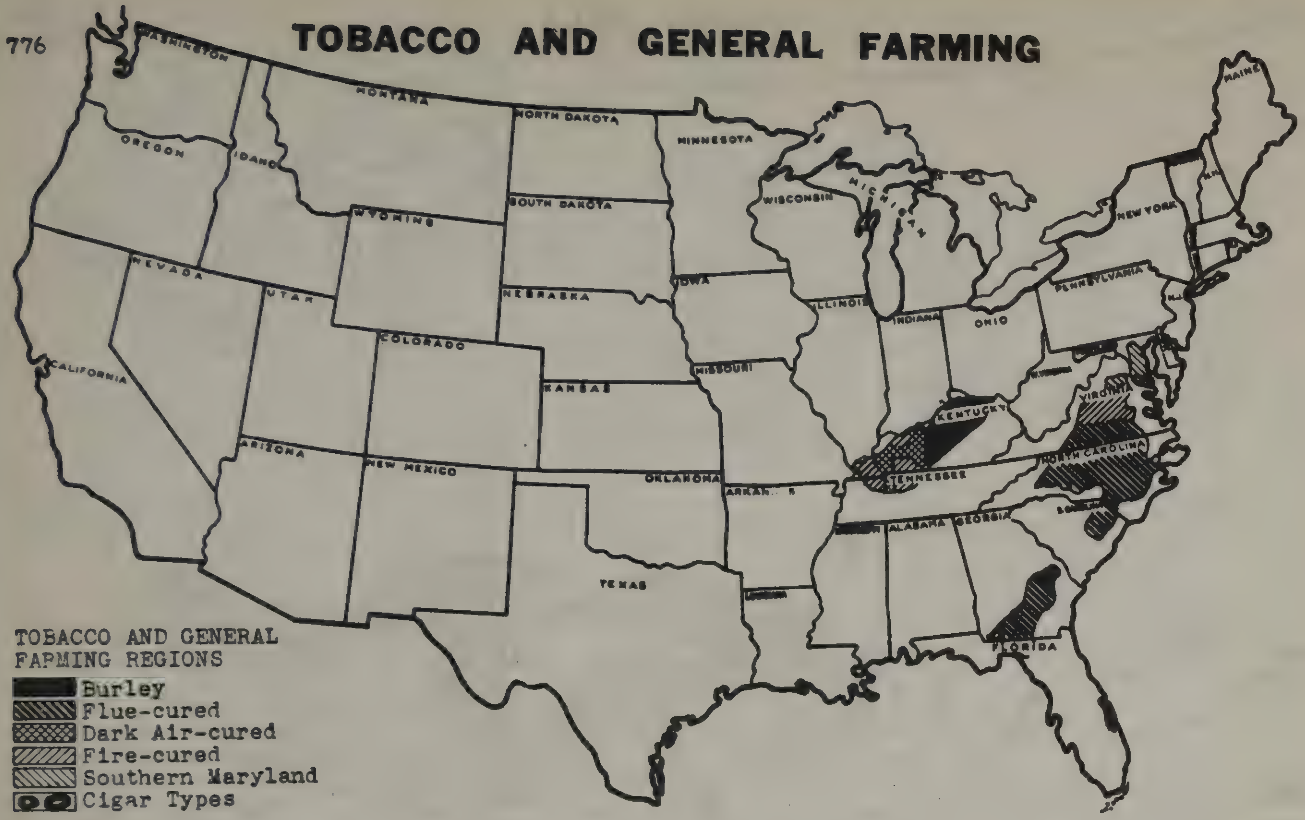

COTTON BELT REGIONS
Mississippi and Red River Deltas
Black Waxy Prairie of Texas
Mississippi Tennessee Brown Loam Area
Northern Piedmont
Tennessee River and Limestone Valleys
Large-Scale Cotton Farming
Oklahoma-Texas General Farming
Arkansas River Valley and Uplands
Piney Woods of Northeast Texas
Southeast Texas-Mississippi Piney Woods - Cotton and Self-Sufficing
Post-Oak Strip - Upper Coastal Prairie
Mississippi-Alabama Clay Hills and Rolling Uplands
Southeast Piedmont
Southwestern Arkansas and Northern Louisiana
Gulf Coastal Plain - Cotton and Peanuts
Eastern Coastal Plain and Sandhills
Southwestern Irrigated Valleys

In the South, cotton is king, for here Nature has joined hands with the Negro cropper to produce a great Cotton Belt rivaling the Corn Belt in importance.

Cotton is adapted to almost any type of soil provided it is well drained, but it grows best on medium loamy or sandy soils. The Cotton Belt, however, is very definitely limited by climatic conditions. Being a subtropical crop, its northern reach is restricted to a growing season of 200 frost-free days, falling roughly along the southern Missouri boundary. To the west, cotton is limited by drouth because a rainfall of at least 20 inches is necessary on most soils for economic production. Along the Atlantic and Gulf Coasts, where rainfall exceeds 60 inches a year, the crop grows rank, and boll weevil is very destructive, thus again very definitely limiting production. Under irrigation, cotton produces extremely well, but the irrigated cotton acreage in the United States is restricted to a few narrow valleys along the Mexican border.

Based on Data of U.S.D.A.

TOBACCO AND GENERAL FARMING



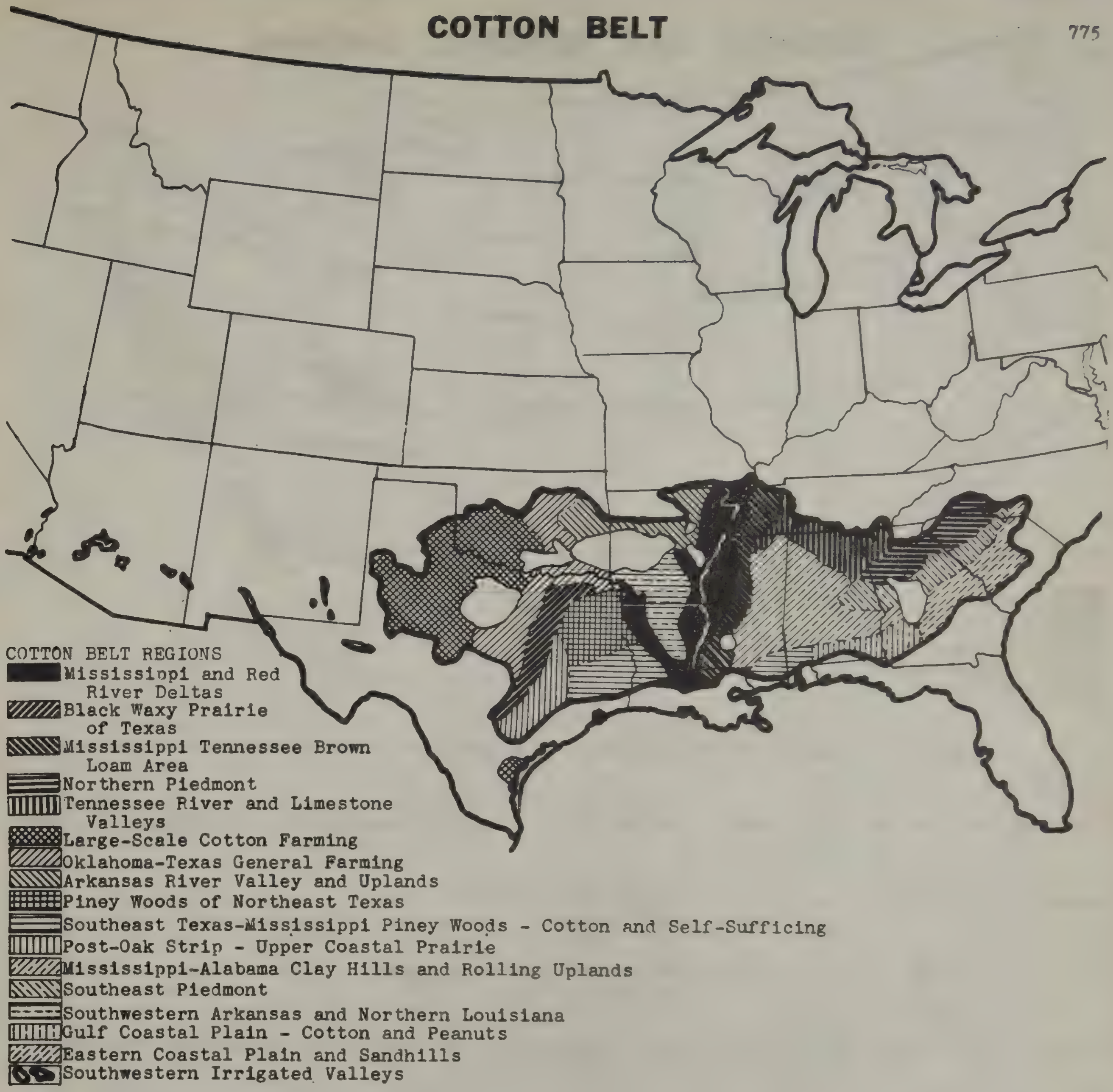
Tobacco is grown in light soils near and slightly beyond the border of the Cotton Belt. The regions may be considered transitional in type because of the large variety of crops grown, but in most of the areas tobacco is the chief cash crop.

Tobacco areas are highly differentiated on the basis of type of tobacco produced. Formerly most of the tobacco was grown on virgin soils but now much of it is grown with fertilizers which are applied according to formula to produce special flavors and blends in the tobacco leaf.

Tobacco is grown in areas other than those shown here. These are merely the regions where this crop is dominant as compared with other national type-of-farming areas.

Based on Data of U.S.D.A.

COTTON BELT



COTTON BELT REGIONS

■ Mississippi and Red River Deltas

▨ Black Waxy Prairie of Texas

▧ Mississippi Tennessee Brown Loam Area

☰ Northern Piedmont

▥ Tennessee River and Limestone Valleys

▦ Large-Scale Cotton Farming

▨ Oklahoma-Texas General Farming

▧ Arkansas River Valley and Uplands

▦ Piney Woods of Northeast Texas

☰ Southeast Texas-Mississippi Piney Woods - Cotton and Self-Sufficing

▥ Post-Oak Strip - Upper Coastal Prairie

▨ Mississippi-Alabama Clay Hills and Rolling Uplands

▧ Southeast Piedmont

☰ Southwestern Arkansas and Northern Louisiana

▥ Gulf Coastal Plain - Cotton and Peanuts

▨ Eastern Coastal Plain and Sandhills

● Southwestern Irrigated Valleys

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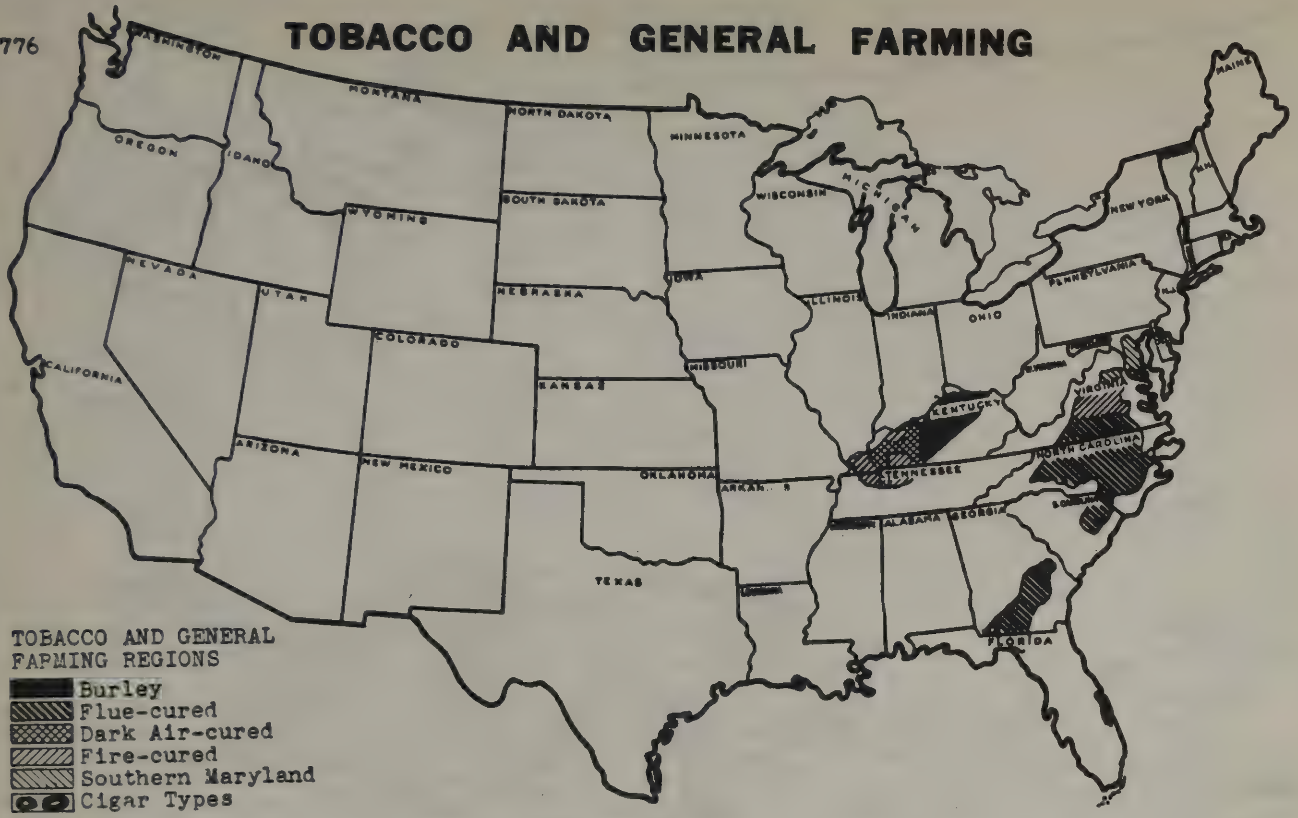

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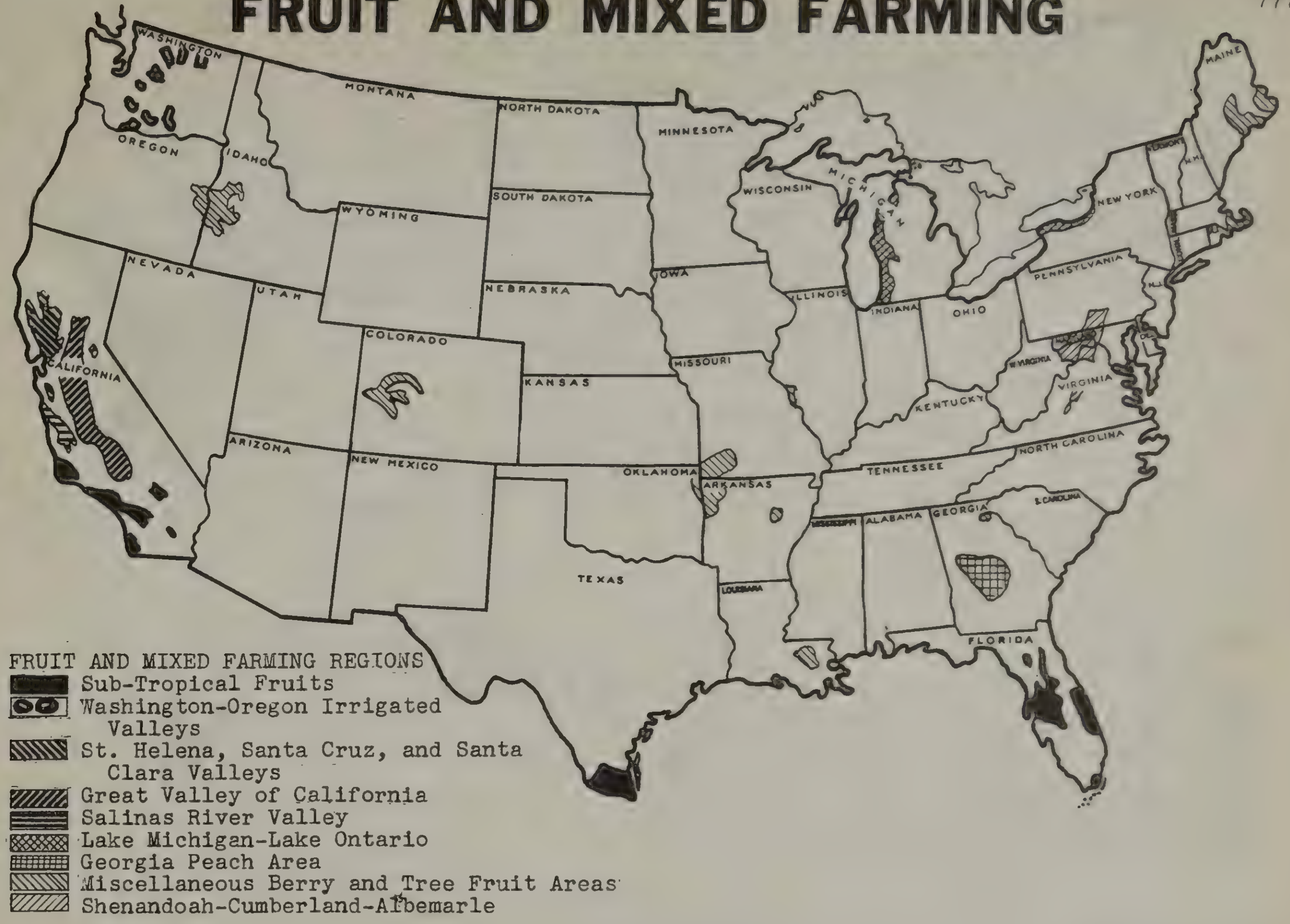
Based on Data of U.S.D.A.

FRUIT AND MIXED FARMING



Climate, soils, and topography are the chief factors leading to the development of fruit regions. A hilly country is most likely to develop into a fruit region because such topography limits the competition of other crops.

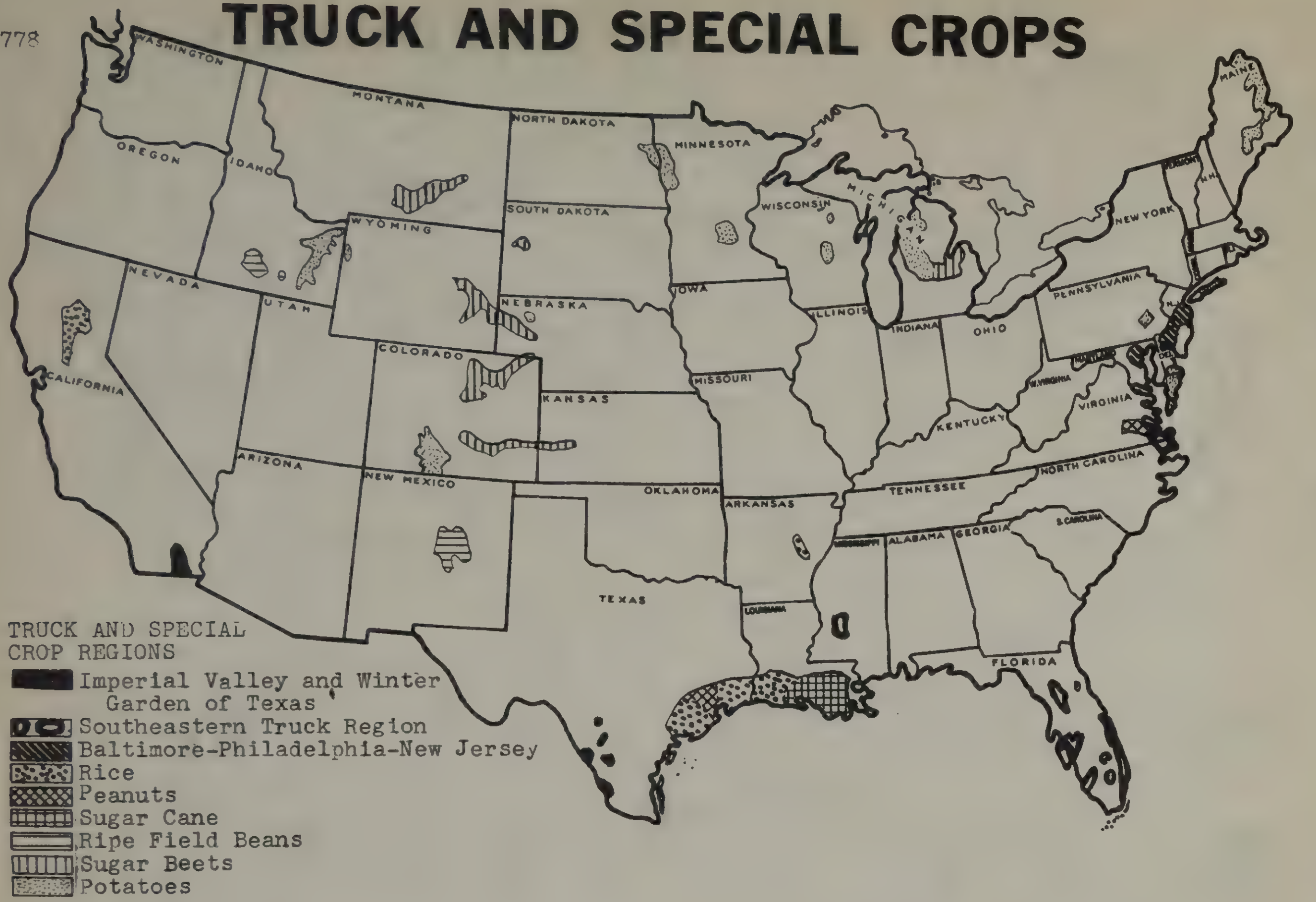
Citrous fruits are sub-tropical and are limited to the warm, frost-free regions of California, Florida, and lower Texas.

Apples and peaches require a long growing season where winter temperatures do not get low enough to kill the buds. Nearness to large bodies of water is especially desirable because it evens out the extremes in temperatures, resulting in a long, cool growing season.

There is a tendency toward diversification in many of these areas by the growing of other general crops and the production of poultry or livestock.

Based on Data of U.S.D.A.

TRUCK AND SPECIAL CROPS



The growing of truck and special crops is widely distributed but of commercial importance only in limited areas.

The winter truck regions have developed along the Gulf of Mexico and in southern California, as fast, refrigerated trains economically take the crops to northern cities.

The Atlantic truck region is supported by the dense population of the Middle Atlantic and New England states.

Potatoes require a cool growing season and do best in a light friable soil.

Sugar beets yield well under irrigation and give large returns per acre, thus accounting for their use under such conditions.

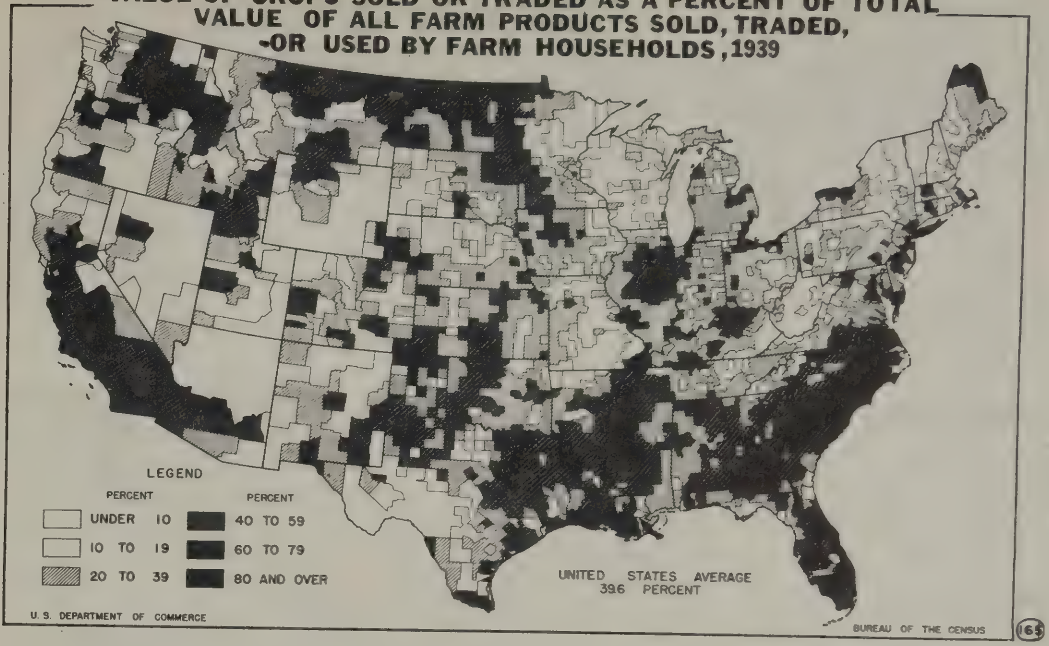
Rice must be flooded during certain periods of its growth, hence is localized when large amounts of irrigation water are easily available and soils will hold the water on the surface.

Sugar cane does best under semi-swamp conditions.

The story of truck and special crop areas is primarily one of utilization of unusual conditions.

Based on Data of U.S.D.A.

CROP SPECIALTY FARMS



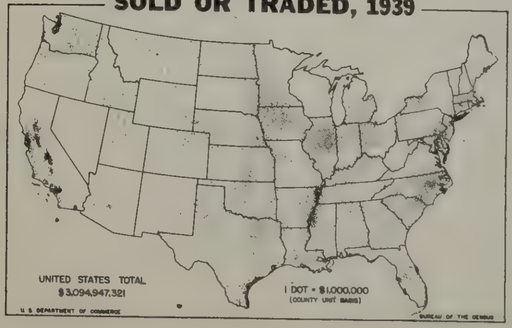
VALUE OF CROPS SOLD OR TRADED AS A PERCENT OF TOTAL VALUE OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS, 1939

Crop Specialty Farms tend to be concentrated in regions where productive soils and favorable climatic factors occur together.

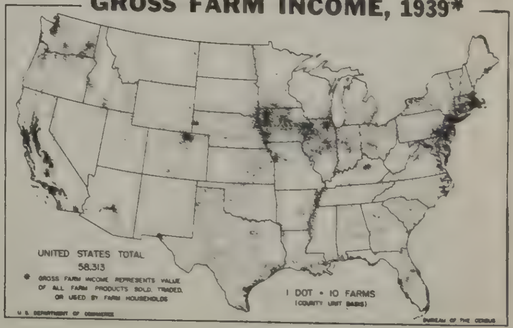
Locational factors including transportation facilities and population also have a direct bearing on the regional development of specialized farming areas, particularly fruit and vegetable sections.

Crop Specialty Farms are frequently highly specialized in the production of one crop. When drouth strikes or crops fail for any reason, income drops sharply. Low prices for the crops produced often result in distress because this system of farming cannot readily adjust itself to changing economic conditions.

In certain specialized crop farming areas the investment per acre, and/or the cost of operation, is so high that there is a threat of excessive loss or bankruptcy following a succession of bad years. This serious hazard greatly restricts further developement of the area.



VALUE OF ALL CROPS SOLD OR TRADED, 1939



FARMS REPORTING $10,000 AND OVER GROSS FARM INCOME, 1939*

UNITED STATES TOTAL
58,313
* GROSS FARM INCOME REPRESENTS VALUE OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS
1 DOT = 10 FARMS
(COUNTY UNIT BASIS)
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

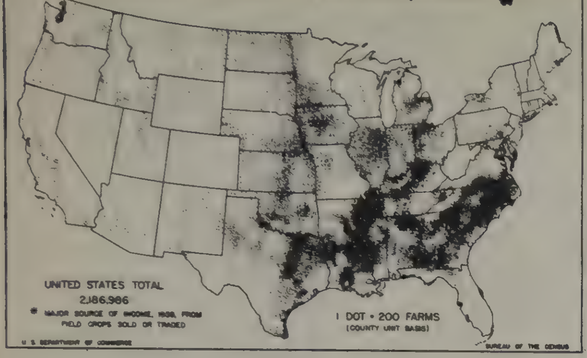
1940 Census Data

DOANE AGRICULTURAL DIGEST 1944

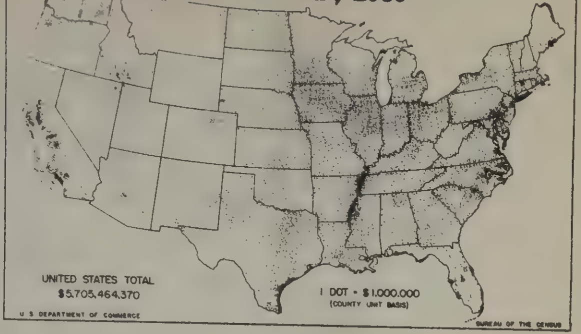
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

CROP SPECIALTY FARMS

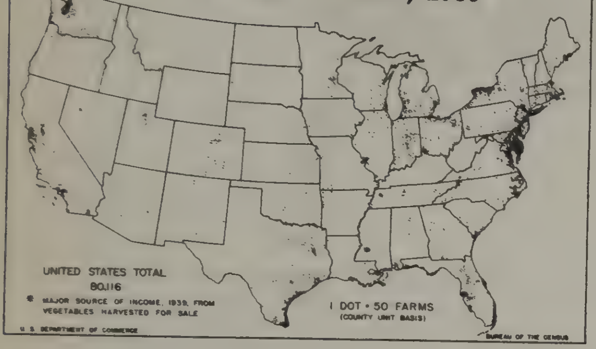
FIELD CROP FARMS, 1939 *


UNITED STATES TOTAL
2,186,986
* MAJOR SOURCE OF INCOME, 1939, FROM FIELD CROPS SOLD OR TRADED
1 DOT = 200 FARMS
(COUNTY UNIT BASIS)
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

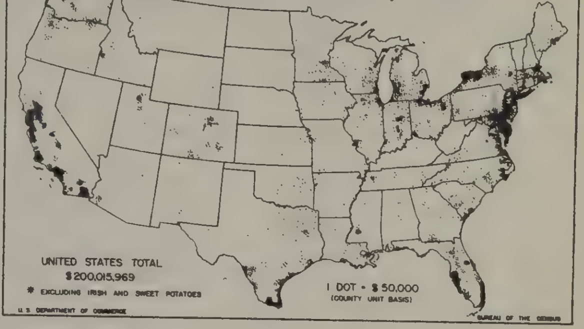
VALUE OF ALL CROPS HARVESTED, 1939



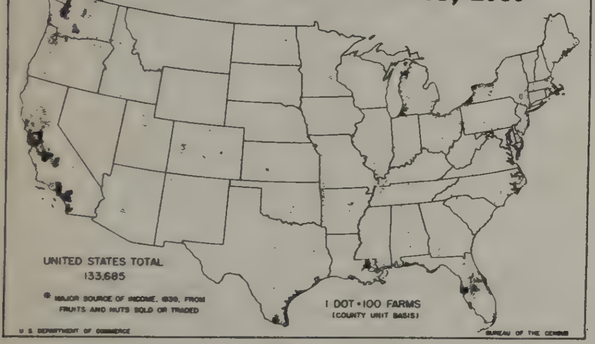
VEGETABLE FARMS, 1939 *


UNITED STATES TOTAL
80,116
* MAJOR SOURCE OF INCOME, 1939, FROM VEGETABLES HARVESTED FOR SALE
1 DOT = 50 FARMS
(COUNTY UNIT BASIS)
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

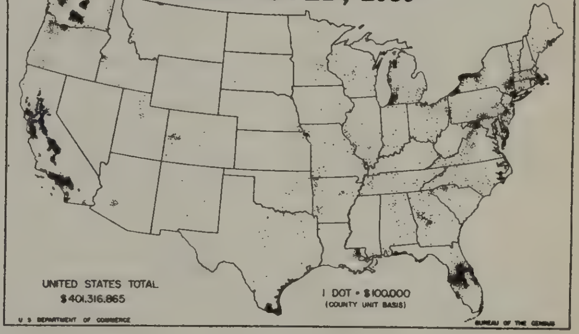
VEGETABLES HARVESTED FOR SALE VALUE, 1939 *



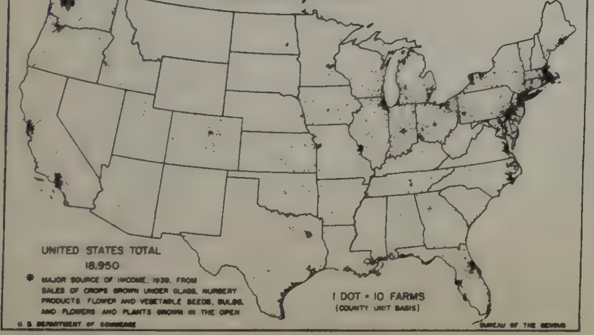
FRUIT AND NUT FARMS, 1939 *


UNITED STATES TOTAL
133,685
* MAJOR SOURCE OF INCOME, 1939, FROM FRUITS AND NUTS SOLD OR TRADED
1 DOT = 100 FARMS
(COUNTY UNIT BASIS)
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

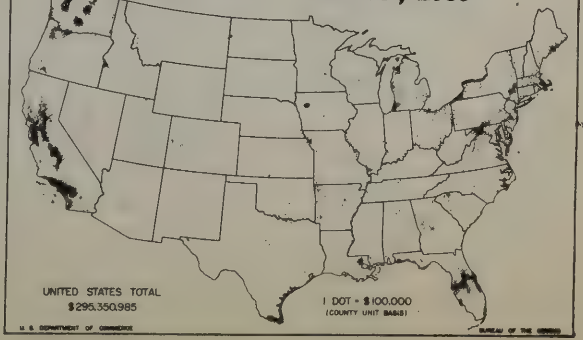
VALUE OF FRUITS AND NUTS HARVESTED, 1939



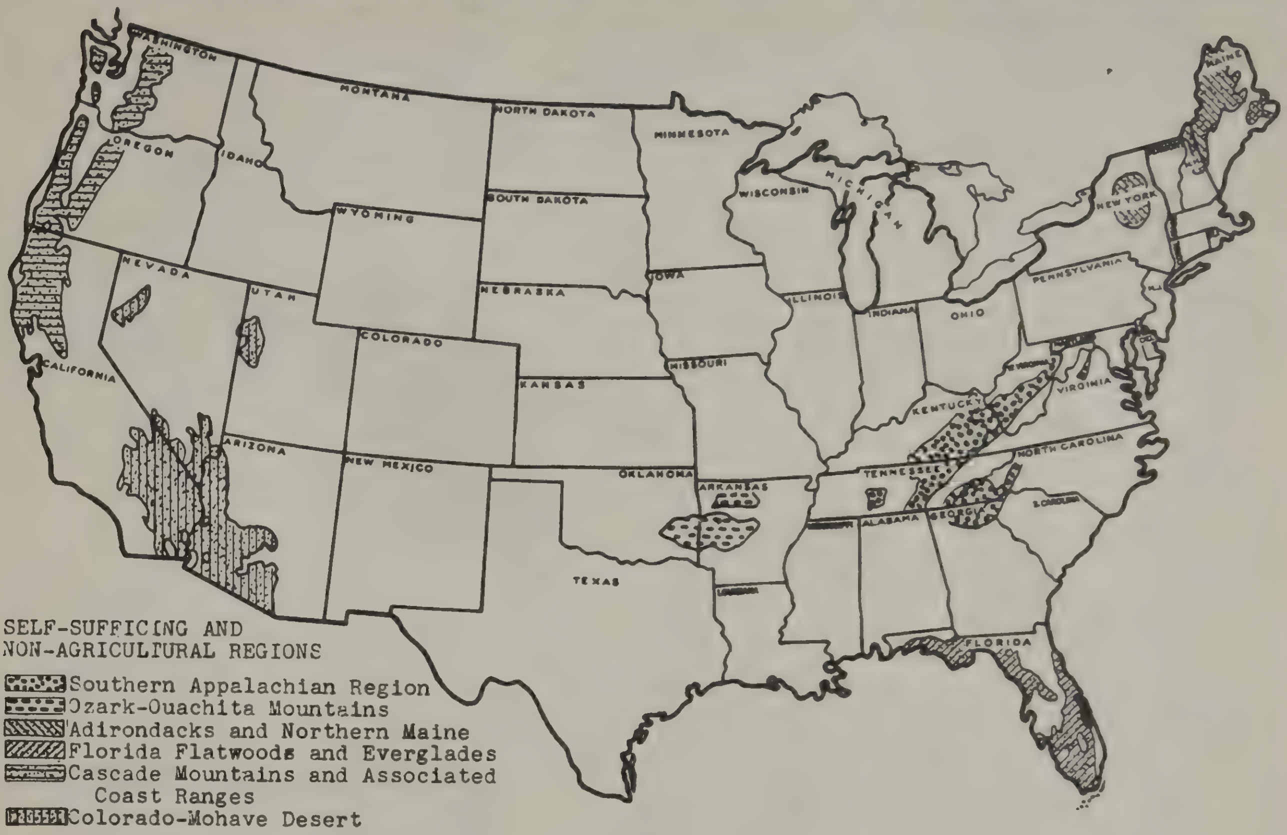
HORTICULTURAL SPECIALTY FARMS, 1939 *


UNITED STATES TOTAL
18,950
* MAJOR SOURCE OF INCOME, 1939, FROM SALES OF CROPS GROWN UNDER GLASS, NURSERY PRODUCTS, FLOWER AND VEGETABLE SEEDS, BULBS, AND FLOWERS AND PLANTS GROWN IN THE OPEN
1 DOT = 10 FARMS
(COUNTY UNIT BASIS)
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

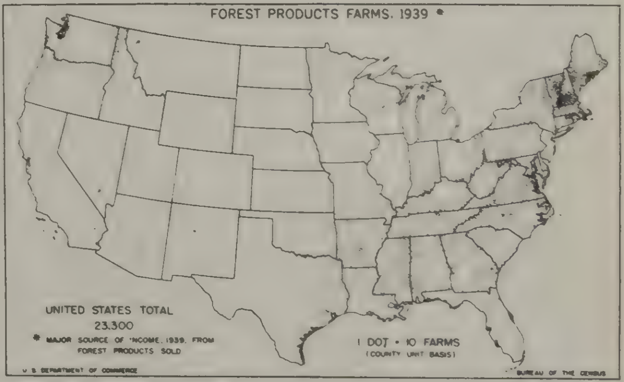
VALUE OF FRUITS AND NUTS SOLD OR TRADED, 1939



SELF-SUFFICING AND NON-AGRICULTURAL REGIONS



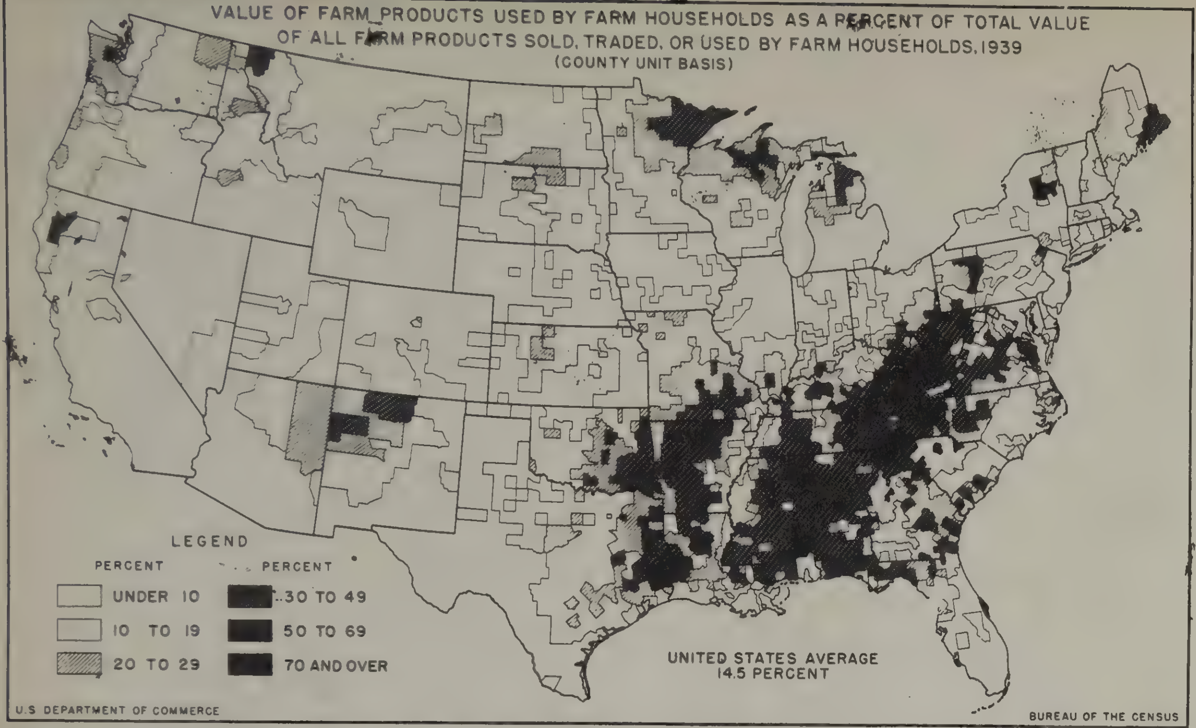
Self-sufficing and part-time farming districts are found in two general regions, one in the Ozarks and one in the Appalachians where timber and mining are the chief enterprises and where land suitable to farming is very limited. Part-time farming is developing rapidly in the vicinity of larger cities, and the recent depressions have served to increase this type of farm operation



Waste lands are found in the arid and semi-arid lands of the far western mountains, in the everglade swamps of Florida, and in the New England mountains.

Based on Data of U.S.D.A.

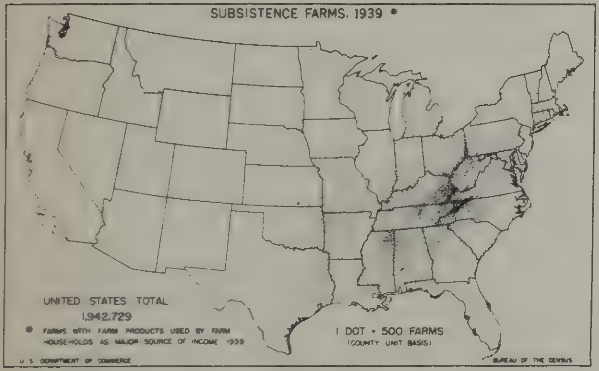
SELF-SUFFICIENT AND LOW INCOME FARMS



VALUE OF FARM PRODUCTS USED BY FARM HOUSEHOLDS AS A PERCENT OF TOTAL VALUE OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS, 1939
(COUNTY UNIT BASIS)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

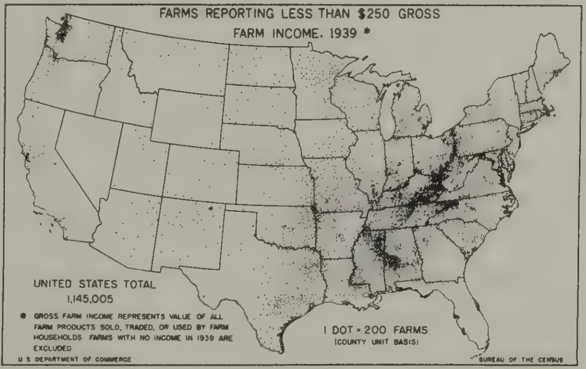
The dark shaded areas on these maps show in strong relief the regions where subsistance and low income farms are most highly concentrated. In general these are areas where crop yields are low and a great diversity of crops and livestock and grain mainly for home use. Normally little income is available from off-the-farm employment and the low cash income results in a low standard of living.



SUBSISTENCE FARMS, 1939 *

* FARMS WITH FARM PRODUCTS USED BY FARM HOUSEHOLDS AS MAJOR SOURCE OF INCOME 1939

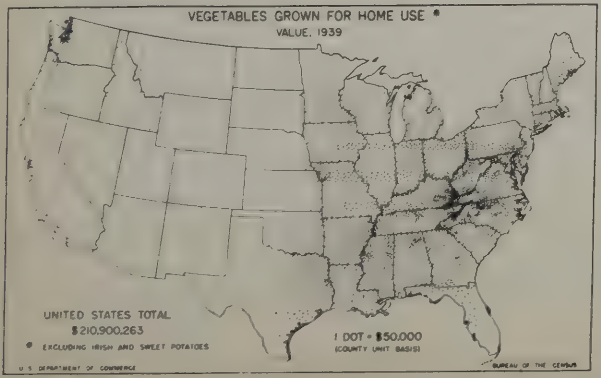
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS



FARMS REPORTING LESS THAN $250 GROSS FARM INCOME, 1939 *

* GROSS FARM INCOME REPRESENTS VALUE OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS. FARMS WITH NO INCOME IN 1939 ARE EXCLUDED

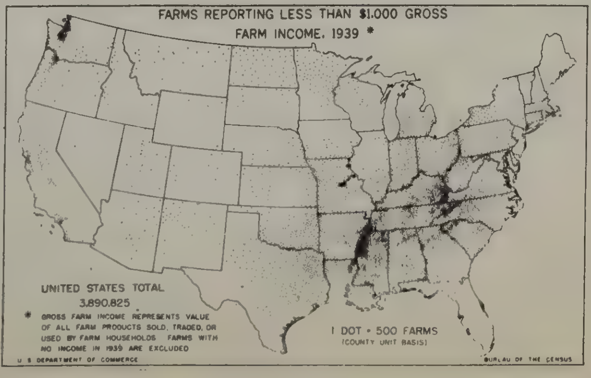
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS



VEGETABLES GROWN FOR HOME USE *
VALUE, 1939

* EXCLUDING IRISH AND SWEET POTATOES

U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS



FARMS REPORTING LESS THAN $1,000 GROSS FARM INCOME, 1939 *

* GROSS FARM INCOME REPRESENTS VALUE OF ALL FARM PRODUCTS SOLD, TRADED, OR USED BY FARM HOUSEHOLDS. FARMS WITH NO INCOME IN 1939 ARE EXCLUDED

U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

800

Hazards

800 Hazards

CHEMICALS FOR WEED CONTROL

Progressive farmers now recognize the use of chemicals as an established part of good farming. The USDA says that our annual 5 billion dollar loss due to weeds could be cut in half if chemicals were used properly.

SELECTING THE RIGHT CHEMICAL

Many of these basic weed chemicals are manufactured by several companies. They may contain another chemical of some value, but it's the active chemical that counts. Compare costs based on the active ingredient. Costs are usually lower if you buy in larger amounts.

Most chemical weed-killers are of some value when used in their proper place. But you must decide whether you can get the job done as cheaply and quickly with chemicals as by some other method.

If possible, rely on successful local weed control tests and get guidance from your county agent, vocational agriculture department or state agricultural college.

If you decide to use these weed-killers, follow recommended application rates as closely as possible. Light applications may not produce full control while too heavy applications may injure the crop as well as your pocket book.

USEFUL CHEMICALS

Pages 821-824 listed some major herbicides useful to farmers. Here are some others:

CMU (3 p-chlorophenyl -1, 1-dimethylurea) is a non-selective organic weed-killer. It is used primarily as a temporary soil sterilant. (All plants are killed.) Shallow-rooted annual weeds have been controlled for a 12 months period with a medium dosage.

CMU has been used effectively to eliminate weeds where crops are not grown, such as around buildings. Work is still being carried out to determine its complete range of usefulness.

MCP (2-methyl-4-chlorophenoxyacetic acid) is closely related to 2, 4-D. European countries have used it as their leading weed-killer as we use 2, 4-D. It is gaining popularity in this country for controlling broad-leafed weeds in peas and flax and in small grains seeded with legumes such as alfalfa, ladino and red clover.

Ammate (ammonium sulfamate) is used to control brush and woody plants. It has often been found superior to 2, 4, 5-T because it kills more types of plants and also a greater proportion of tops and roots. However treatments of ammate usually run slightly higher in initial cost than 2, 4, 5-T or 2, 4-D brush killers. But as a rule less frequent applications are neccessary.

Carbon Bisulphide is a temporary soil sterilant. Special hand equipment is used to inject the chemical about 5 inches in the soil where its heavily diffused vapors fill the air spaces around the soil particles. If more than an acre is to be treated, custom application is preferable.

This chemical is not effective on shallow-rooted annual weeds, but works quite well against deep-rooted perennials. Care should be taken to avoid contact with desirable plants. Carbon bisulphide also kills soil insect life.

Potassium Cyanate is a selective killer of crabgrass in lawn's and certain vegetable crops. It is low in cost and safe to handle.

Oils (petroleum napthas) are being used effectively for post-emergence weed control. Fortified oil has other herbicides added. These oils are finding considerable use against weeds in cotton and soybean fields.

Crag Herbicide (2, 4-dichlorophenoxy ethyl sulfate) stunts germinating weed seeds without affecting established crops such as strawberries. Pre-emergence treatment on deeply planted corn has also been successful. It kills both broadleaf and grass weeds during germination.

Sodium Chlorate is a soil sterilant. It is used to a great extent around buildings and other areas which need to be kept weed-free and where no crops are grown. Soils remain sterile for a year or more. Borates are sometimes added.

Analap-l (N-1 Napthyl phthalamic acid) is a pre-emergent herbicide. It has little or no effect on emerged weed seedlings but will retard growth of many weeds and grasses for 3 to 6 weeks. It is showing good control of weeds in watermelon, muskmelon, and cucumbers.

Maleic Hydrazide is a plant growth inhibitor as well as a herbicide. Many weeds are killed while the growth of many others is delayed. MH is being used to slow lawn growth and make fewer cuttings necessary.

Sodium Pentachlorophenate is being used as a pre-emergence treatment for corn and potatoes. It dissolves easily and is applied over the row before either crop or weeds come up. There is little or no damage from spray drift.

One treatment will save at least one cultivation and will give weed control at less cost than cultivation. Take care in handling as it is toxic to humans.

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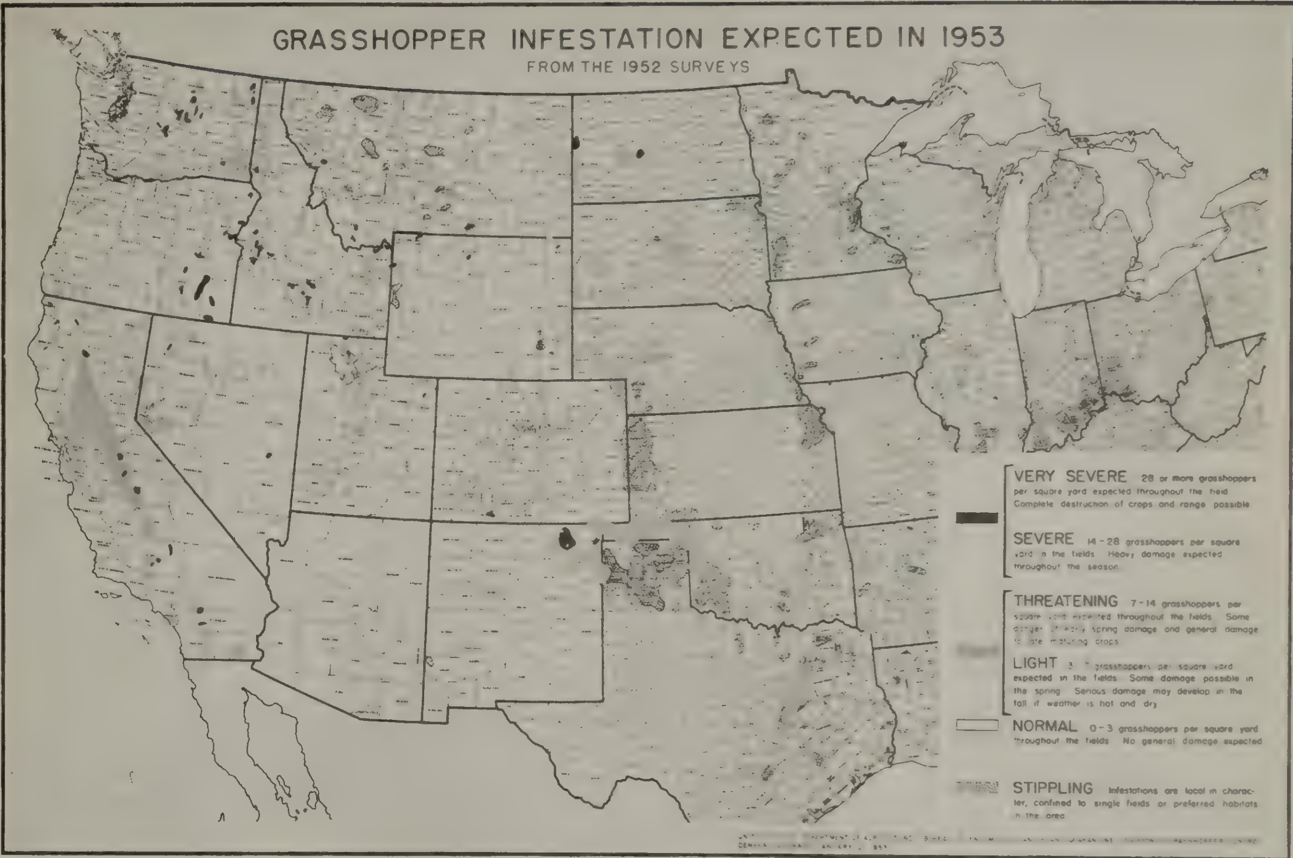
CHEMICAL WEED CONTROL SUMMARY

CROPS	RECOMMENDED CHEMICAL	WHEN TO TREAT	APPLICATION RATE	COST PER ACRE CHEMICAL ONLY*	REMARKS
ALFALFA (established)	DNOSBP (dinitro) ammonium or amine salts; for control of broad leaved annual weeds.	When seedling alfalfa is in 2-6 leaf stage or 5 to 6 inches high.	1½ pounds in 30 to 50 gallons of water.	$6.00	Best results on warm still days when temperature is between 65° and 85° F.
	Sodium TCA -- for grass control.	In fall after grass has germinated or in spring before or slightly after emergence of seedling.	12 to 15 pounds with 12 to 15 gallons of water.	$5.50-7.00	Avoid contact with skin or clothing. May cause equipment to corrode upon standing.
CORN & SORGHUMS	2,4-D for post- or pre-emergence treatments.	Pre-emergence--before corn or sorghum plant comes up.	Pre-emergence - 1 to 2 pounds with 10 to 20 gallons of water.	$1.00-2.00	Most effective on heavier soils. Not advisable on sandy soils.
		Post-emergence — anytime until corn or sorghum plant is 16 inches high.	Post-emergence - 1/4 to 2/3 pound acid equivalent with 5 to 10 gallons water.	$ .25-.65	Cultivation will probably be necessary to control certain weeds. Some soils must have cultivation.
COTTON	DNOSBP (dinitro) for most annual weeds.	Pre-emergence behind packer wheel at planting time.	2 to 3 pounds in bands with 10 to 12 gallons of water.	$8.00-12.00	Soil should be well pulverized.
	CIPC	Pre-emergence before plants come up.	1½ pounds for sandy soils to 3 pounds for heavy soils.	$3.00-6.00	Oil should be added. Cultivation may be needed when treating for perennial grasses.
	Herbicidal oils for control of annual grasses and broad leaved weeds.	Post-emergence when in the seedling stage.	5 gallons.	$1.25	Make a second or third application as needed, but not more often than every 5 days.
FLAX	MCP for annual broad leaved weeds.	Flax should be at least 2 in. tall.	4 oz. in 15 to 20 gallons of water.	$ .90	Caution should be taken against skin contact.
	Sodium TCA for green and yellow foxtail, barnyard grass & cheat	Flax should be at least 2 in. tall, grasses less than 2".	6-9 pounds with 10 to 20 gal. of water.	$2.75-4.00	TCA may be applied at the same time as MCP.
PASTURE, DITCH BANKS AND FENCE ROWS	2,4-D for annual broad leaved weeds.	When plants are in full leaf and actively growing.	3 pounds in 100 gallons of water.	$3.00	Wet thoroughly. Use 2,4,5-T, 2,4-D or ammate if woody plants are present.
POTATOES	2,4-D for annual broad leaved weeds.	Pre-emergence (3 to 5 days) before plants come up.	1½ to 2 pounds with 10-20 gal. of water.	$1.50-2.00	Cultivation is generally recommended but chemicals may be of value in wet weather.
	DNOSBP (dinitro) for weed seedlings.	Pre-emergence.	1½-3 lbs. in bands.	$6.00-12.00	
	Sodium pentachlorophenate (wide range of kill).	Pre-emergence.	10-20 lbs. in 40 gallons of water.	$3.50-7.00	
	TCA (for grasses).	Pre-emergence.	8-10 lbs. with 8-10 gallons of water.	$3.50-5.00	
RICE	2,4-D	4-8 weeks after rice emerges.	½ to 1¼ lbs. with 5-15 gal. of water.	$ .50-1.25	Treatment after flooding is safer than before flooding. Don't overdose.
	MCP	7-9 weeks after plantings when flooded at 6 inches.	1 to 1½ pounds with 10 gal. of water.	$3.50-4.00	Shows less injury to rice than 2,4-D. Weed control about equal.
SMALL GRAINS (oats, wheat, barley)	2,4-D (where legumes are not included).	In spring prior to boot stage when about 4-8 in. high.	1/4 to 1/3 lb. with 10-25 gal. of water.	$ .25-.35	Injury may result if applied prior to tillering or after boot state.
	MCP (where legumes are present).	Same as for 2,4-D.	1/4 to 1/2 lb. with 10 gal. of water.	$ .90-1.30	Don't use MCP on seedling alfalfa, clover or birdsfoot trefoil unless injury can be tolerated.
STRAWBERRIES	CRAG Herbicide 1	After plants are established, but before weeds germinate. Later applications can be made.	4 pounds with 50 to 100 gal. of water.	$8.00	Do not spray from blossom until after harvest.
SUGAR BEETS	Sodium TCA to control apring annual grasses.	Pre-emergence before plants come up.	7-10 lbs. with about 10 gal. of water	$3.00-5.00	Apply soon after planting to control yel. & gr. foxtail, water grass.
SUGAR CANE	2,4-D for annual broad leaved weeds.	(1) On summer plant cane 1 or 2 applications (Aug.1 to Oct. 15) followed by flame cultivation, or 4-8 lbs. TCA on drill.	1 pound on top of row with 10-12 gal. of water.	$1.00 per application	
		(2) Spring treatment 2 applications 3-4 weeks apart followed by flame cultivation.	1 pound on top of row with 10-12 gal. water.	$1.00 per application	Combination of 2,4-D -- TCA -- flame cultivation, usually gives best results.
		(3) Immediately after lay-by.	2 lbs. with 10-15 gallons of water.	$2.00	
	Sodium TCA for grasses including Johnson grass.	Spring treatment in place of first 2,4-D application.	4 lbs. on 2 ft. drill with 8-10 gal. water.	$2.00	

* Based on 1953 retail prices

Prices and References: Dow Chemical, Monsanto Chemical, Lion Oil Co., G.S. Robins Co. Crops & Soils, University of Arkansas, Iowa Farm Science

INSECT HAZARDS OF 1953


GRASSHOPPER INFESTATION EXPECTED IN 1953
FROM THE 1952 SURVEYS
VERY SEVERE 28 or more grasshoppers per square yard expected throughout the field Complete destruction of crops and range possible
SEVERE 14 - 28 grasshoppers per square yard in the fields Heavy damage expected throughout the season
THREATENING 7 - 14 grasshoppers per square yard expected throughout the fields Some danger of early spring damage and general damage to late maturing crops
LIGHT 3 - 7 grasshoppers per square yard expected in the fields Some damage possible in the spring Serious damage may develop in the fall if weather is hot and dry
NORMAL 0 - 3 grasshoppers per square yard throughout the fields No general damage expected
STIPPLING Infestations are local in character, confined to single fields or preferred habitats in the area

GRASSHOPPERS

No widespread heavy infestations are expected on croplands in 1953. Serious local problems are likely in central South Dakota, northeastern Wisconsin, Texas panhandle and central Utah. Dry weather can bring trouble to Illinois, Indiana, and Ohio.

Northeastern New Mexico is expected to have the most serious infestation of any of the range areas. This will possible extend into Oklahoma,. Colorado, and Texas. Severe, local infestations may occur in Montana, Idaho, Washington, Oregon, Nevada, and Utah. Unusually heavy infestation is expected in North Dakota.

Aldrin, toxaphene and chlordane in spray or dust form are the recommended insecticides. Check along roadsides, fence-rows, and ditches. Act promptly and treat infested areas just before hatching is complete.

CHINCH BUGS

In Oklahoma, Arkansas, Missouri, and Illinois a greater number of chinch bugs went into hibernation in the fall of 1952 than in recent years. Trouble is expected in these states if spring and early summer is warm and dry. Local infestation is expected in Indiana.

For control use barriers of dintro-o-cresol, DDT, or benzene hexachloride dusts applied in narrow bands. Spraying or dusting with DDT or toxaphene is also effective.

ALFALFA WEEVIL

This pest was first found in the eastern states in 1952. Damage occurred in Pennsylvania, New Jersey, Delaware, Maryland, and Virginia.

Weather conditions hindered early weevil development in some western states in 1952. Late development usually means a large number going into winter and widespread damage could occur this year.

A good winter survival was reported in Utah and adults were observed early in Nevada.

Control by spraying with dieldrin or chlordane on early spring growth. In May or June dust or spray with calcium arsenate, methoxychlor or parathion.

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INSECT HAZARDS OF 1953

CORN EARWORM

Infestation was smaller in the South in 1952 than in previous years. Severe damage occurred in localized areas of Maryland, Delaware, Montana and Colorado. A dry summer can bring serious damage in the Corn Belt. The earworm is also known as the cotton bollworm and the tomato fruitworm.

Control the earworm with a spray of emulsified DDT, white mineral oil and water one day after first silks appear and again two days later. Use DDT for cotton bollworm and cryolite for tomato fruitworm.

ARMYWORM

Infestations are in small grain in Texas, Oklahoma, Kansas, and New Mexico. Heavy infestation is expected in Mississippi. The army cutworm is found in most alfalfa and wheat fields in Oklahoma and Utah.

Control can be either by a trench barrier, broadcast poison bran bait as applied for grasshoppers, or by DDT or toxaphene spray or dust. The effect to warm-blooded animals, eating materials with a residue of DDT or toxaphene, is not completely known.

BOLL WEEVILS

Hibernation counts are high in most Cotton Belt areas. Heavy infestation is expected unless June and July weather control the weevil.

Varying mixtures of calcium arsenate, BHC, toxaphene, aldrin, parathion, DDT, and dieldrin can be used. Use according to local recommendations.

PINK BOLLWORM

Counties in Texas, Oklahoma, Louisana and Arizona, were newly infested in 1952. Pink bollworm moths have been emerging in Texas throughout the winter. Less damage is expected in 1953 than in 1952.

For control, destroy cotton stalks immediately after harvesting, bury gin waste, compress lint, and spray or dust with DDT. Many counties are under quarantine in an effort to destroy this pest. Following quarantine regulations is very important.

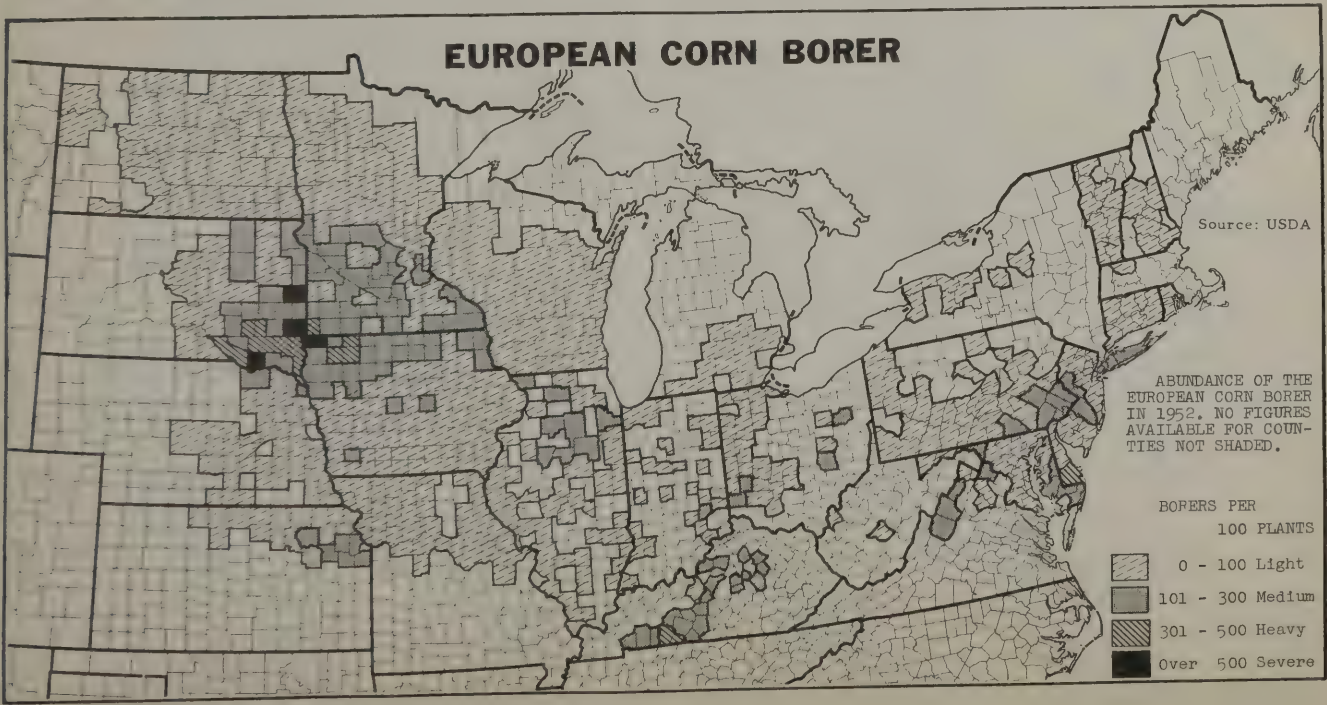
EUROPEAN CORN BORERS

There was practically no change in the over-all infestation in 1952 as compared to 1951. Trends toward higher infestations are reported in Illinois, Iowa, Kansas, Kentucky, Minnesota, and South Dakota. Heaviest infestation in 1952 was in adjoining sections of South Dakota, Iowa and Minnesota.

Infestation in 1951 was reported by 37 states. There were no additional states in 1952. However, infestation was reported in 43 counties for the first time.

Many borers in northern regions wintered in an inmature stage and will not survive. Enough were mature, however, to cause trouble with favorable conditions. The map shows danger areas and indicates borer population.

Most effective control is clean plowing and late planting. Close observation and prompt action with DDT and ryania spray or dust are effective if cultural practices fail.



EUROPEAN CORN BORER

Source: USDA

ABUNDANCE OF THE EUROPEAN CORN BORER IN 1952. NO FIGURES AVAILABLE FOR COUNTIES NOT SHADED.

850

Population

850 Population

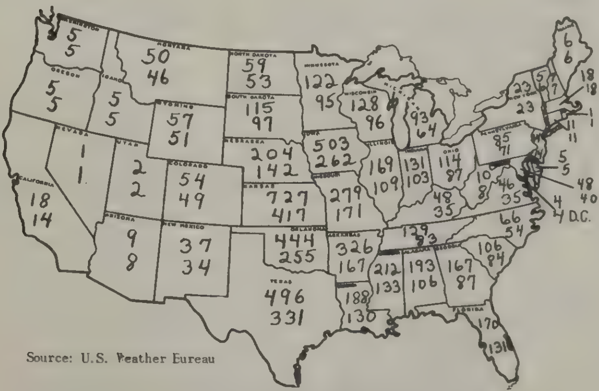
TORNADOES

The tornado is the most violent of all storms. It has a funnel-shaped cloud with upward spiraling winds of terrific force.·

Des Moines Register, AP Photo

The relatively flat Central Plains of the United States are the most favorable place in the world for tornado formation.

Tornadoes follow the seasonal trend of thunderstorms and hail, occurring in the eastern Gulf States at the beginning of the year, then advancing northwestward to reach Iowa and Kansas in June. The tornado period in these states lasts until late September. From then until January there is a rapid decline in numbers.



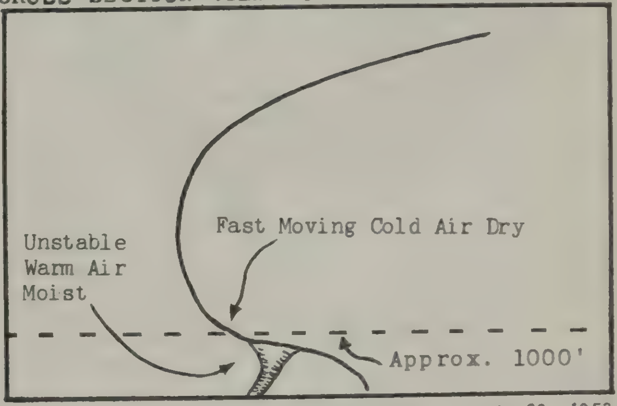
Source: U.S. Weather Bureau

The upper figure -- total number of tornadoes reported during the 36-year period.
The lower figure -- total number of days in which tornadoes were reported in state.

The map shows, by states, the total number of tornadoes from 1916 through 1951 (upper figure) and the number of days with tornadoes reported for this same period (lower figure). During this period, tornadoes occurred in all states, including the District of Columbia.

Tornadoes nearly always occur with thunderstorms, especially those accompanied by hail. Often they are found in a series of two or more -- usually one large tornado and one or more lesser storms. Tornado formation requires the presence of layers of air of contrasting temperature, moisture, density and windflow.

CROSS SECTION VIEW OF TORNADO CONDITIONS



LIVESTOCK WEEKLY, MARCH 26, 1953

TORNADO DAMAGE

The destructiveness of a tornado depends on the length and width of its path, as well as on the density of population in the area. The average annual loss in the United States from tornadoes is $15 million. Loss for the first 7 months of 1953 was $179.6 million -- 12 times that amount. Previous record of damage in one year was in 1927 when it reached $43 million.

From 1916-1951 total property damage amounted to $476 million. There was an average of 153 tornadoes each year, resulting in 222 deaths. Through July 1953, deaths were double that figure.

One of the greatest tragedies from tornadoes occurred March 18, 1925, when 740 were killed in Missouri, Illinois and Indiana. In 1953, the greatest tragedy occurred in Waco, Texas. Luckily death losses were much lower because of advance warning, but still 114 died. Total damage exceeded $41 million, more than the total tornado losses for any year except 1927.

With many tornadoes yet to be reported, 1953 property and crop damage losses will be close to $215 million -- a record we hope never is broken. Over 400 died and close to 5,000 were injured in the 371 tornadoes reported from January to July 1953.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
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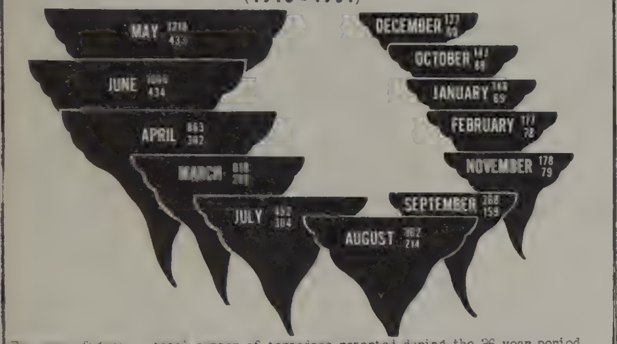
TORNADOES

From 1916-1951, the total number of tornado deaths (7,995) was less than one-fourth the 1951 automobile accident fatalities (37,100) reported by the National Safety Council. With ever-improving weather forecasting, advance warnings of tornadoes are cutting death losses.

TORNADO FREQUENCY BY MONTHS IN THE UNITED STATES (1916 - 1951)



The upper figure -- total number of tornadoes reported during the 36-year period.
The lower figure -- total number of days in which tornadoes were reported.
Source: U.S. Weather Bureau

WARNING SYSTEMS

During the months of the year when tornadoes are most prevalent, daily weather maps, charts and diagrams are carefully studied to identify weather situations which may lead to the development of destructive local storms, including tornadoes. Although progress has been made, it still is not possible to predict the beginning of individual tornadoes.

Local warning networks have been set up in areas where tornadoes occur most frequently, as one step to aid in reducing loss of life and property. Volunteer workers are the backbone of the warning service. Reports from radar observations, pilots and airport control towers help in tracing a storm's path.

Although some warning networks have been established, many more are needed. Such networks are made up of people who know their part in the warning program -- whether to watch for and report tornadoes immediately, or to act in other ways to help prevent loss of life and unnecessary alarm.

For information on how to set up a local storm warning network, call the nearest Weather Bureau, or write to the Chief, U.S. Weather Bureau, Washington 25, D.C.

TORNADO CHARACTERISTICS

Time of Day -- usually mid-afternoon, from 3 to 7 p.m. But have occurred at all hours.

Direction of Movement -- usually from southwest to northeast.

Lengths of Paths average between 10 and 40 miles, but may reach 300 miles.

Widths of Paths average about 300 to 400 yards -- but have been a mile or more.

Speed of Travel forward averages from 25 to 40 miles per hour. Reported ranges are as low as 5 miles and as high as 139 miles per hour. Vertical and horizontal wind speed within the vortex have never been measured, but horizontal wind speed has been estimated as high as 500 miles per hour. The greater the length of the funnel, the higher the wind speed.

A funnel 2,000 feet long should create a windspeed of 225 miles per hour; 5,000 feet, 285 miles per hour; 10,000 feet, 544 miles.

Clouds -- usually dark heavy thunderstorm clouds, from which a whirling funnel-shaped pendant often extends to the ground.

Precipitation -- first it rains, frequently it hails, just before the storm. Heavy downpour right after the storm.

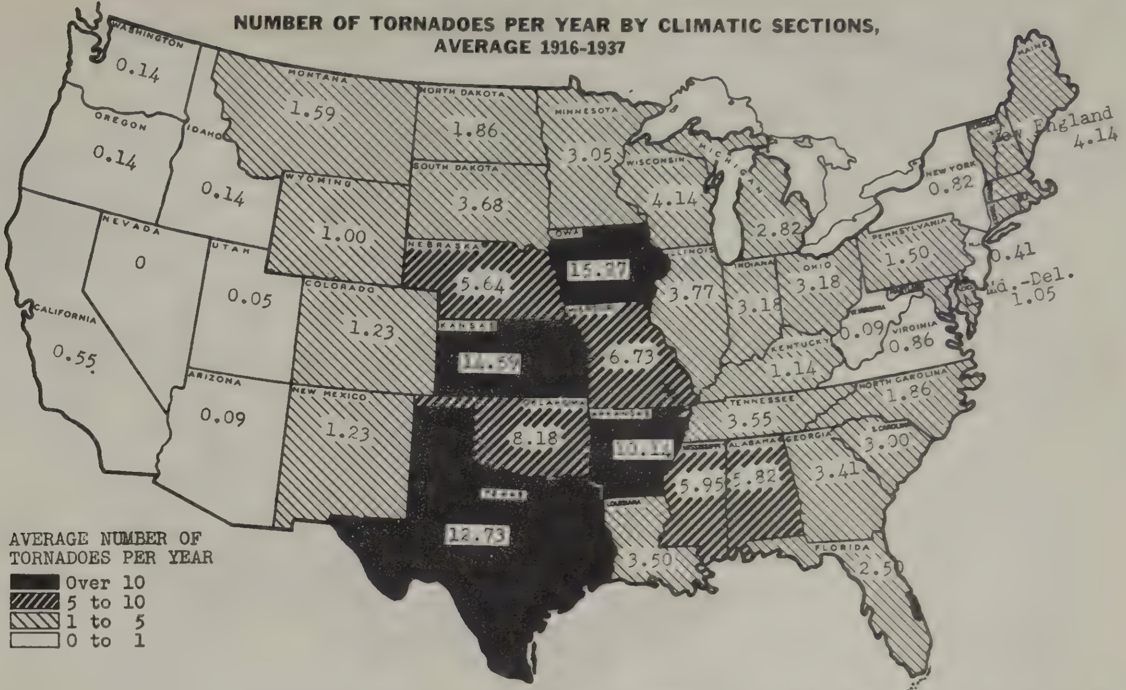
Cause of Destruction -- violent winds which uproot trees, destroy buildings, and which create a serious hazard from objects blown through the air. Also great differences in air pressure which can lift automobiles and can cause buildings to collapse.

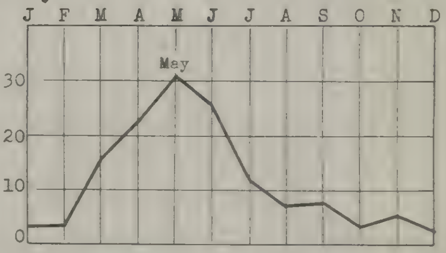
A.M. Wettach Photo

TORNADO SAFETY RULES

- When time permits, go to a storm cellar, cave or underground excavation with an air outlet to help equalize the air pressure. Keep a pick and shovel in your shelter.
- If in open country, move at right angles to the tornado's path. If there is no time to escape, lie flat in the nearest ditch or ravine. The side of a bluff facing a tornado is usually safer than the other side.
- If in a city or town, seek inside shelter, preferably in a steel reinforced building. STAY AWAY FROM WINDOWS!
- In your home, the southwest corner of your basement is the safest place. People living in brick or stone houses should seek other shelter. Shut off electricity and fuel lines if you have time, and open windows on north and east sides of the house slightly to equalize pressure.
- Try to keep calm! Don't panic.
- Keep tuned to your radio station for latest tornado information.

TORNADOES


NUMBER OF TORNADOES PER YEAR BY CLIMATIC SECTIONS, AVERAGE 1916-1937



AVERAGE FREQUENCY OF TORNADOES
(By Months In The U. S.)

A total of 3,092 tornadoes was reported in the United States during the 22-year period 1916-1937. Figures on the above map show the average number of such storms per year in each climatic section. The storms occurred most frequently in Iowa, with Kansas and Texas, respectively, claiming the next largest share. No tornado occurred in Nevada during the period.

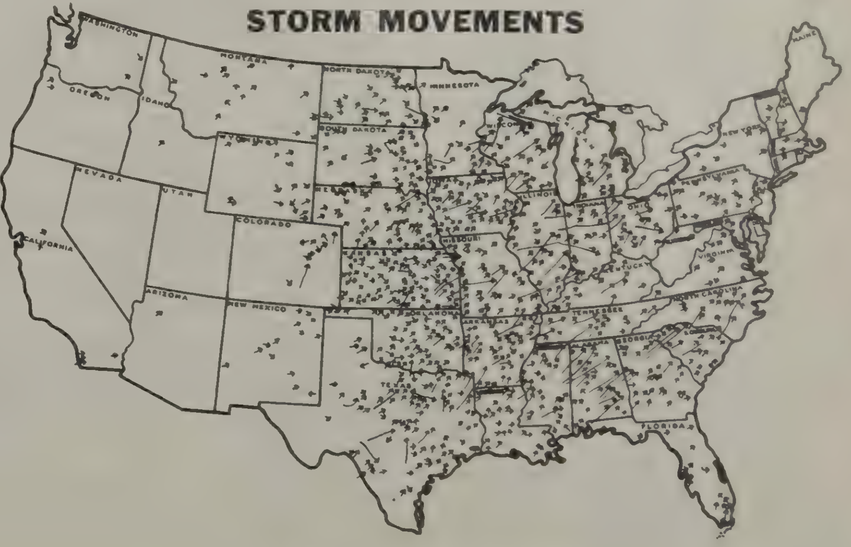
These storms are most frequent in May, as shown by the accompanying graph, and least frequent in December. May averaged about 1 tornado per day for the entire period, while December averaged about 1 every 10 days.

Tornadoes are vigorous local windstorms, the most violent type of all cyclonic storms, caused by atmospheric phenomena rising from the meeting of warm, moist tropical air from the south and southwest with cold, polar air descending from higher latitudes over the broad expanse of comparatively level valleys and plains. They are most frequent in the afternoon between 4 and 6 p.m.; least frequent between 7 and 8 a.m. Average width of path is about 400 yards; length, about 13 miles; speed of advance, 45 miles per hour. The cloud usually is funnel shaped.

The arrows on the lower map show the direction of storm movements and approximate location of tornadoes for the 14-year period, 1916-1917 to 1929-1930.

It is apparent that tornadoes are hazards of varying severity depending upon the state or locality. Within tornado areas special attention should be given to storm insurance as this is a risk that individuals should not undertake to carry. Types of building construction and other protective features should also be considered.

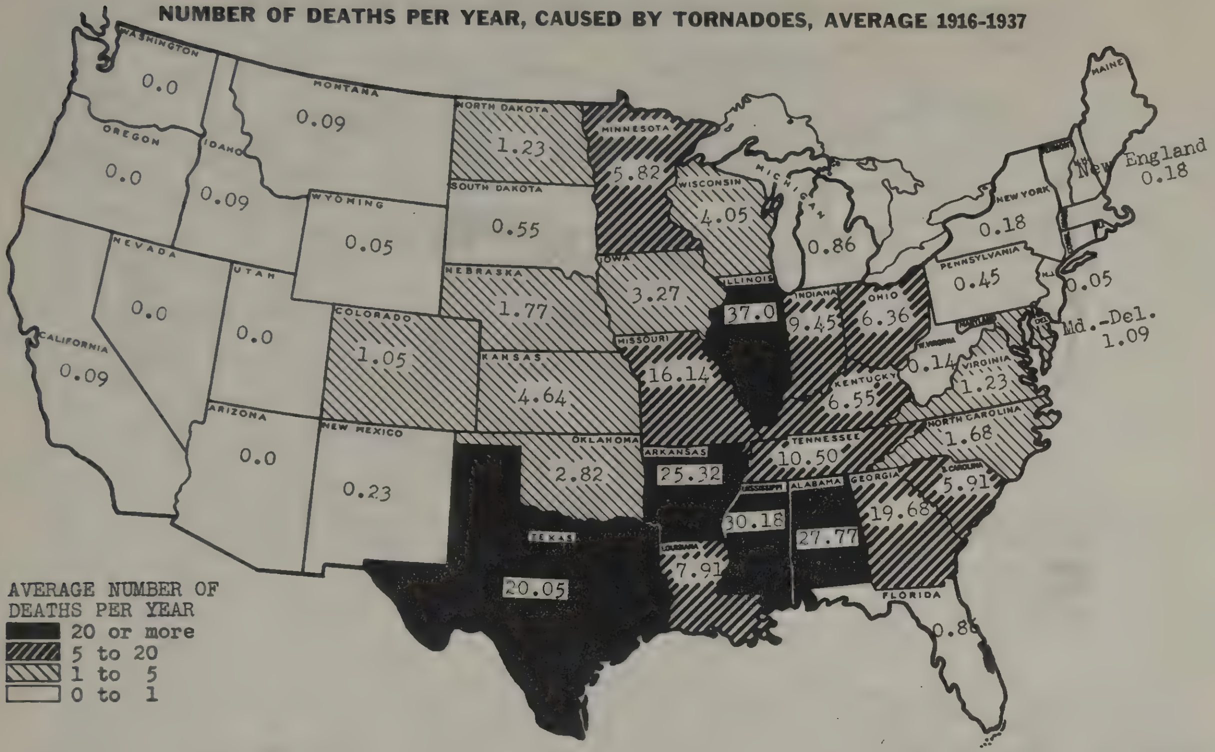
STORM MOVEMENTS



U. S. Weather Bureau

TORNADOES

NUMBER OF DEATHS PER YEAR, CAUSED BY TORNADOES, AVERAGE 1916-1937



Illinois showed the highest average number of deaths per year during the 22 years, 1916-1937, as indicated by the above map. No fatal tornado occurred in Arizona, Nevada, Oregon, Utah, or Washington.

Highest per year average of property damage was found in Missouri, as shown by the table below. (67 per cent of Missouri's total occurred in 1927).

Missouri	$1,494,675	Michigan	$310,066	North Dakota	$39,227
Illinois	1,358,300	Tennessee	254,127	Florida	35,337
Georgia	929,568	Kentucky	222,205	Colorado	28,173
Ohio	859,915	South Carolina	219,852	Wyoming	18,244
Texas	642,584	Nebraska	216,400	New Mexico	13,814
Iowa	578,847	Louisiana	200,127	California	12,977
Indiana	559,289	North Carolina	147,150	Montana	8,569
Kansas	555,532	Pennsylvania	125,477	West Virginia	1,364
Minnesota	545,882	South Dakota	91,414	Oregon	482
Alabama	495,645	New England	83,827	Idaho	182
Mississippi	446,875	Maryland-Delaware	59,474	Arizona	114
Oklahoma	437,423	New York	55,305	Washington	11
Arkansas	414,345	New Jersey	52,659	Utah	Slight
Wisconsin	353,082	Virginia	49,000	Nevada	None

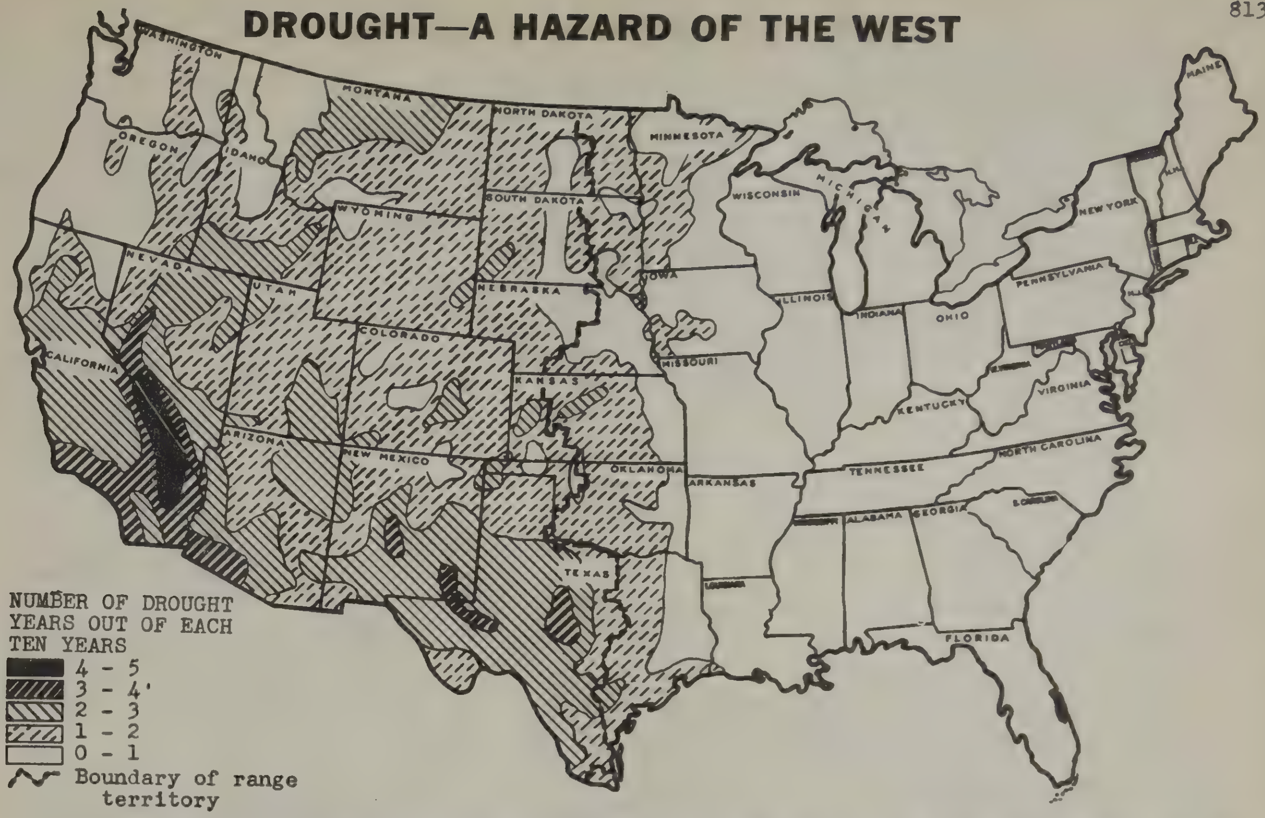
One reason for the showing of fewer tornadoes, fewer deaths and less property damage in certain areas is the sparse settlement. Storms moving through such areas may be equally severe but receive little consideration as compared with those which strike cities or thickly settled farming communities.

SAFETY PRECAUTIONS

In the absence of a cyclone cellar the southwest portion of the cellar of a frame house is a comparatively safe place. Depending upon the severity of the particular storm, the same corner of the cellar in a brick or masonry building is probably safer than any other portion of the structure, though there is always the danger of the upper part of the building, particularly if of flimsy brick construction, collapsing and falling into the cellar. Occasionally people have found safety by throwing themselves flat in depressions in the earth's surface, but the fact that tornadoes have drained water from deep wells proves that even deep excavations are not always entirely safe places of refuge. Trees, and other objects likely to be carried away or blown down, should be avoided. The south, or right side, of a tornado's path is the more dangerous, and tornadoes usually travel in an easterly direction; these two points should be remembered when seeking safety in flight.

U. S. Weather Bureau

DROUGHT—A HAZARD OF THE WEST

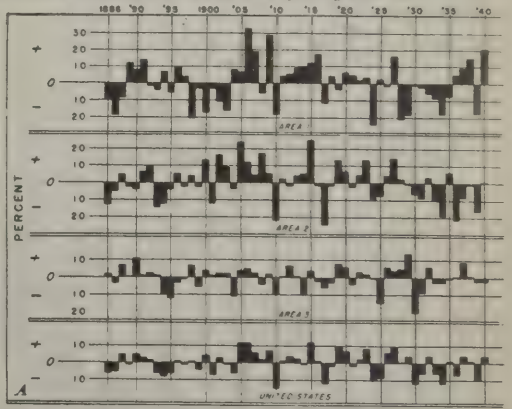


Drought is a major and consistent hazard in regions of the West where ranching predominates, as is shown by the 35-year record on the accompanying map. This record does not include the severe drought year of 1934 and those which followed. This is for the period 1899-1933 inclusive.

Drought, for the purpose of this map, is defined as a year with 75 per cent or less of average annual precipitation. On this basis there are great areas of the range country where serious droughts are experienced two to five years or more out of every ten. Throughout the Great Plains the average has been computed as one serious drought every four years.

Precipitation Characteristics and Trends

A serious feature of drouths is the tendency for dry years to occur in groups. The western part of the United States is characterized by cycles of wet and dry years and violent year to year fluctuation. The area between the Rocky Mountains and the Mississippi is also characterized by long wet and dry cycles and only slightly less violent year to year changes. The region east of the Mississippi usually has a rather constant rainfall. In this region maximum range for the wettest to the driest year is 35 per cent as contrasted to 50 per cent in Area 2 and 58 per cent in Area 1. (See graph)



Area 1 western part of the country to the Rocky Mountains; normal precipitation, 17.9 inches.

Area 2. from the Rocky Mountains to the Mississippi River; normal precipitation, 28 inches.

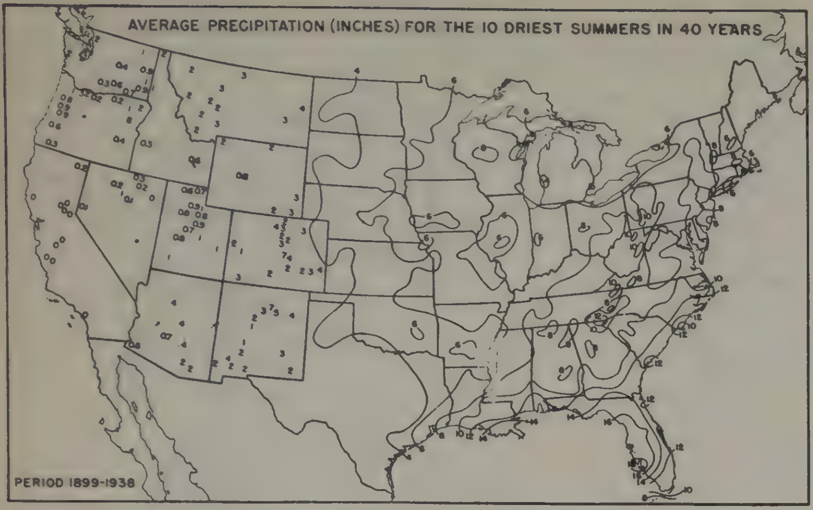
Area 3, from the Mississippi to the Atlantic coast; precipitation, 43.5 inches.

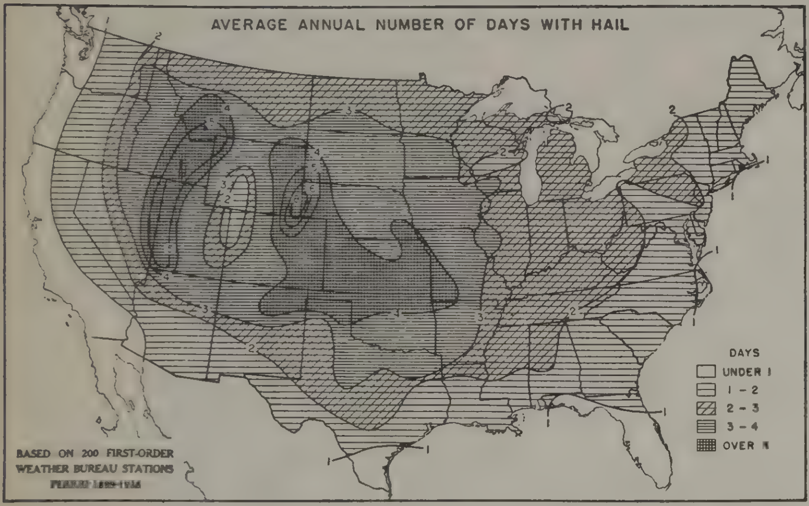
There is hardly a year when a drought does not occur somewhere in the country. The most outstanding recent dry years occurring in one or more of the western regions are the following: 1886 to 1888, 1893 to 1895, 1898 to 1903, 1910, 1917, 1924, 1928 to 1934, 1936, 1937, 1939.

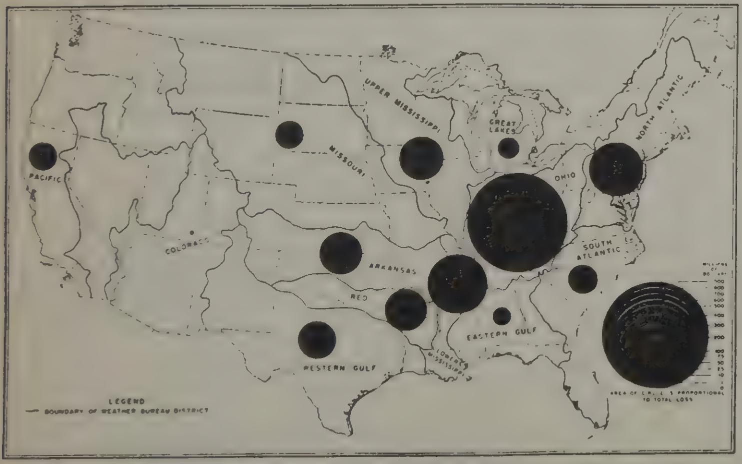
Throughout all the western range area it is important to determine that grazing is so managed as to maintain vigorous forage capable of weathering severe droughts. The management should also make provisions for these periods of low income and high expense if financial failure is to be avoided.

Data from Senate Document 199
Graph from U.S.D.A. Yearbook Climate & Man 1941

OTHER WEATHER HAZARDS


AVERAGE PRECIPITATION (INCHES) FOR THE 10 DRIEST SUMMERS IN 40 YEARS
PERIOD 1899-1938


AVERAGE ANNUAL NUMBER OF DAYS WITH HAIL
DAYS
UNDER 1
1 - 2
2 - 3
3 - 4
OVER 4
BASED ON 200 FIRST-ORDER WEATHER BUREAU STATIONS



Distribution of estimated flood losses in the United States, by regional divisions, July 1, 1902, to December 31, 1937.

SUMMER DROUTH

Summer drouths varying in length for a few days to several weeks are common throughout the midwest. The intensity and frequency of summer drouth decreases from west to east but even a short summer drouth occurring at a critical stage in the development of a particular crop may have disastrous results. Hot, dry winds frequently accompany summer drouth and add to the damage of drouth by burning and blasting tender shoots.

The summer-drouth map indicates that in 4 years out of 10 summer precipitation is only 1/2 to 2/3 of normal. The proportion is much more serious in the west where normal summer rainfall is hardly sufficient to support cultivated crops.

HAIL

Hail storms of varying intensity occur throughout most of continental United States. The principal center is in the Great Plains.

"As judged by the amount of hail insurance sold, hail losses (to corn) are largest in the midwest states of Kansas, North Dakota, Iowa, South Dakota, Nebraska, Minnesota, and Oklahoma . . ."

The most frequent hail injury to crops results from the loss of leaf surface due to shredding and tearing of the leaves." Reduction in yield of corn from hail injury is relatively slight when the plants are young, increase gradually to a peak at the period just preceeding tasseling, and decrease again as maternity is approached." In the case of small grain and many other small stemmed crops losses increase up to the blooming stage and remain high until harvest.

FLOODS

The region of most severe flood damage is shown in the maps.

"The cost of a flood to a community includes these principal items:

1. Loss of life
2. Danger to public health
3. Damage to movable property
4. Damage to immovable property
5. Intangible losses, such as disruption of business and transportation."

Facts contradict the prevailing idea that floods occur in a well-defined "flood season." Of the 168 months in the period 1924-37 shown in the table below only 15 did not bring to some locality a flood of damaging proportions.

Loss of life and property from floods in the United States, 1924-37, inclusive

Month	Property loss	Lives lost	Month	Property loss	Lives lost
	Dollars	*Number*		*Dollars*	*Number*
January	429,579,704	192	September	29,017,389	40
February	11,668,111	6	October	29,295,960	6
March	182,037,019	81	November	51,816,720	94
April	421,758,397	359	December	22,750,787	27
May	62,428,287	170	Monthly average	8,515,000	7
June	106,685,176	158			
July	56,678,806	104	Annual average	102,182,000	90
August	26,821,341	28			

2,4-D--THE NEW WEED KILLER

2,4-D is a powerful weapon, as dangerous as a loaded gun. Severe crop damage can result from careless use of the chemical.

Lawsuits involving damage to cotton crops from careless use of 2,4-D on rice in the south have already started. If you hire a commercial operator to apply 2,4-D, better get a signed statement that he will protect you from liability under the law. This may not protect you completely, but it will help.

Deformed cornstalk - result of spraying with 2,4-D. Yields were cut 50 per cent by spraying in this field

"In general, grasses are highly resistant to 2,4-D For this reason lawns, grain fields, and corn often can be sprayed with 2,4-D solution and the weeds killed without injuring the crop. For the same reason 2,4-D is almost worthless in combating weedy grass.

"The greatest use of 2,4-D is for eradicating broad-leaved weeds like wild mustard, cocklebur, and ragweed.

"The greatest hazard in using 2,4-D is the danger to broad-leaved crops like cotton, tomatoes, and clover.

WHEN AND WHERE TO USE 2,4-D

"Time of application is determined largely by the stage of growth of the weed and, in the case of selective sprays, by the stage of growth of the crop plants. In general, 2,4-D treatments have been most effective if applied when weeds are succulent, or at least in an active stage of growth.

"Annual and Winter Annual Weeds in Cereal or Grass Crops: Treat when weeds are young , usually in early spring. Winter annuals may be safely treated in late fall in well-established perennial grasses but not in fall-seeded cereals. Do not spray in cereals before the tillering (stooling) stage or after the jointing stage, except after bloom. Do not spray seedling grasses before they are 2 months old. (Do not use 2,4-D where legumes have been seeded as a catch crop)

"Weeds in Corn and Sorghums: Commercial varieties of hybrid and open-pollinated corn differ considerably in response to 2,4-D treatments. Since these differences have not been completely established, 2,4-D should be used cautiously on new varieties or others whose tolerance to this chemical is not known. Many broad-leaved weeds, but not grassy-type weeds, can be controlled successfully in corn with rates of applications not likely to seriously injure most varieties or hybrids. Applications should be made when the corn is from 1 to 3 feet high. The weed problem is generally more acute during this period and the weeds are in a more susceptible stage of development. Rates of application should not exceed the minimum dosage considered necessary to control the weed species present. Perennial weed patches in corn can be successfully treated in early fall with 2,4-D at moderately heavy rates without injury to the maturing corn. Recommendations for use in sorghum are essentially the same as for corn.

"Annual Weeds in Fence Rows and Other Noncultivated Areas: Spray as soon as all of the weeds have emerged. Most annual weeds become more resistant with age. Great care must be taken that the spray does not drift on to sensitive crops in adjoining fields Two applications a year may be required.

"Lawn Weeds: Early spring or fall treatments usually have given best results on dandelion, plantain, chickweed, and most other broad-leaved lawn weeds. Late spring and summer treatments in general are less satifactory.

"Biennial and Perennial Weeds: 2,4-D treatments should be applied after complete emergence and before the full-bloom stage of growth. Best results on weeds, such as hoary cress, which form rosettes at a certain stage of growth have been obtained from applications made at the rosette stage. The optimum stage for killing usually occurs in spring or fall. Selective spraying of biennial and perennial weeds in cereal crops is desirable only when the weed reaches the proper stage and before the crop reaches the boot stage of growth; this is usually when the crop is in the tillering (stooling) stage.

"Troublesome Woody Plants: On the whole the best way to kill woody plants with 2,4-D is to mow them first and use the chemical to spray the sprouts after they reach a height of 12 to 18 inches.

PRE-EMERGENCE WEEDING WITH 2,4-D

"Pre-emergence weeding is the practice of killing weed seedlings in the soil in advance of the emergence of the crop, so that the crop will require little or no cultivation or other kinds of subsequent weed destruction. 2,4-D and a few other chemicals have been successfully used for pre-emergence weeding and the method shows considerable promise. When 2,4-D is used, the crop is planted and the soil sprayed a day or two later with 2,4-D at the rate of about 2 pounds per acre. Pre-emergence treatment with 2,4-D has been used chiefly on corn, but some other large-seeded crops may react in a similar manner. It will be noted that higher rates of application of 2,4-D are required for pre-emergence weeding than for foliage sprays but the maximum tolerance limits for various crops have not been determined. A very attractive feature of the pre-emergence method is that it controls grassy weeds almost as well as broad-leaved weeds. It appears to be more satisfactory on heavy soils than light soils and does not work at all well if the soil is cloddy or stony.

Quotations selected from "Killing Weeds with 2,4-D by L. W. Kephart and L. S. Evans. U.S.D.A.

AMOUNT OF 2,4-D TO USE

"The recommended range in dosage of 2,4-D for various situations is given in the Table. Esters should be applied at the lower end of the range, especially in selective spraying. The amine salts and sodium salts should be applied near the upper range.

SUGGESTED RATES OF APPLYING 2,4-D
UNDER VARIOUS WEED CONTROL SITUATIONS*

Kind of weed and situation	pounds of 2,4-D acid per acre
Selective Spraying In Crops Or Turf:	
Flax	1/8 to 1/4
Cereal crops and Seedling Grasses:	
Annual and winter annual weeds	1/4 to 3/4
Biennial and perennial weeds	1/2 to 1
Established stands of Perennial grasses:	
Annual, winter annual weeds	1/4 to 1
Biennial and perennial weeds	3/4 to 1-1/2
General spraying - Not in crops:	
Annual, winter annual, and biennial weeds	3/4 to 1-1/2
Perennial weeds:	
Sensitive species, e.g. bindweed	1 to 2
Resistant species, e.g. hoary cress Canada thistle	1 to 4

Rates are expressed in terms of 2,4-D acid, The amount of any commerical product required can be determined by dividing the percentage content of 2,4-D in the product into the amount of 2,4-D acid in the table. For example: With a product containing 40 per cent 2,4-D or equivalent the amount of material required to equal 1 pound of 2,4-D is 1 ÷.40 or 2-1/2 pounds.

KIND OF 2 4-D TO USE

"Numerous preparations of 2,4-D are now on the market. These products, which vary in content of 2,4-D from about 10 to about 85 per cent, are of three general types:

"Sodium Salt of 2,4-D: The sodium salt can be obtained as the crude salt, as a mixture of 2,4-D acid and an alkali, and in a new "monohydrate" form. The latter is much more soluble than the old forms, and is useful in areas having hard water. Sodium salt 2,4-D is a dry powder in which the active ingredient varies from 60 per cent to about 85 per cent. Most sodium salts act somewhat more slowly upon weed and crop plants than do the esters and they are more easily washed from the plants by rains. They are usually the cheapest form of prepared 2,4-D.

"Amine Salts of 2,4-D: The amine salts are used in more commercial preparations than any other form of 2,4-D. The concentration varies from 10 per cent to about 60 per cent acid equivalent. Amine salts are liquids, readily dispersible in water. They are very easily handled and produce about the same final effects on plants as the sodium salt. Like that salt they act somewhat more slowly than the esters. The amines are ordinarily intermediate in price.

"Esters of 2,4-D: An ester is a salt made by combining an acid and an alcohol. Several esters of 2,4-D are now in commercial use, including the ethyl, amyl, iso-propyl, and butyl. There seems to be little to choose between these. Esters of 2,4-D are oily liquids containing from 10 per cent to 45 per cent of the parent acid. All form milky emulsions with water. Esters, while more expensive, usually are more active than the other salts especially under unfavorable weather conditions and upon the less susceptible species. When used as a selective spray in crops, an ester should be applied at a lower rate than the other types.

"2,4-D Dusts: A dust may be prepared from any of the three types of 2,4-D by mixing it in low concentration with a suitable finely powdered carrier. Dusts usually are suited only for large-scale operations. They require special equipment and techniques and must be used with extreme care to avoid a drift of the very fine powder onto valuable plants. Damage is said to have occurred at distances of several miles when dusts were used carelessly. Dusts should be applied only under conditions of high humidity and practically no air movement. More 2,4-D is usually required for good results in dust form than when used in a spray.

"2,4-D Compared with Dinitro Compounds as Selective Sprays: Certain so-called "dinitro" compounds are about as effective as 2,4-D on most kinds of annual and winter-annual weeds when they are small, and when moderate temperatures and dry weather prevail. 2,4-D has proved more effective when the weeds are large or when conditions of low temperature or wet weather, or both, prevail. Some common annual weeds in small grains are more effectively controlled by the dinitro weed killers than by 2,4-D. Some perennial weeds in small grains for which dinitro compounds are not effective can be effectively controlled by 2,4-D

"2,4-D sometimes causes greater injury to the cereal crops than dinitro compounds and cannot be recommended at all in peas or other legumes. Its use in flax should be limited to low dosages. Injury to crops from the dinitro compounds is a temporary burn of the foliage, whereas the injury from 2,4-D is a permanent stunting effect or malformed growth, especially if applied at excessive rates.

HOW TO APPLY 2,4-D

"The essential requirement of spraying equipment is uniform coverage on the leaves of the plant with a minimum of run-off or wind drift. Spraying pressures between 30 and 100 pounds per square inch give best results for weed control. Improvement in nozzle design and performance...have made low-volume field equipment popular especially in areas where the transportation of large volumes of water for conventional spraying is costly and inconvenient. Best results are obtained in low-volume spraying by using not more than 10 gallons of solution per acre. In addition to special nozzles low-volume equipment includes a pressure gauge, an "in-the-line" screen of not less than 80 mesh, and individual screens on each nozzle to prevent clogging of the small spray orifices

PRINCIPAL POISONOUS PLANTS

Plant	Location	Parts of plant that usually cause poisoning	Animals most commonly poisoned	Conditions under which poisoning usually occurs and minimum quantity required	Characteristic effects
Arrowgrass (*Triglochin maritima*).	Salt or alkaline marshes and wet places throughout the United States.	Leaves and stems	Cattle and sheep	Eating about 1 percent of animal's weight of green plant in a few minutes.	Difficult breathing, spasms, coma, illness of short duration.
Baccharis (*B. ramulosus*)	Hillsides of western Texas and southern New Mexico and Arizona.	Leaves	Cattle	Scarcity of feed in fall and early winter.	Extreme prostration, severe inflammation of stomach.
Beach laurel (*Leucothoe davisiae*).	Springy ground in Sierra Nevada Mountains of California.	do	Sheep	Eating 0.2 pound in a day's feeding.	Salivation, vomiting, weakness.
Bitter rubberweed, bitterweed (*Actinea odorata*).	Western Texas to southeastern California.	Leaves, stems, and flowers.	do	Eating small quantities daily for several days.	Vomiting, weakness.
Black nightshade (*Solanum nigrum*).	Waste ground from Maine to California.	Green fruit and leaves	Cattle, sheep, goats, chickens, ducks, and geese.	Feeding on green plant	Thirst, diarrhea, loss of appetite, weakness, lack of coordination.
Brake, bracken fern (species of *Pteridium*).	Thickets, hills, and rich woods throughout United States.	Fronds	Horses and cattle	Eating 5 pounds daily for about a month.	Horses: lack of control of legs, weakness. Cattle: hemorrhages in various parts of body.
Cherry (wild) (species of *Prunus*).	Hillsides, along streams, in woods throughout United States.	Leaves	Sheep and cattle	Eating 1 percent of animal's weight of green plant in a few minutes.	Difficult breathing, spasms, coma, illness of short duration.
Cocklebur (species of *Xanthium*).	In fields and waste land of the eastern half and low wet places of the western half of the United States.	First or primary leaves of seedlings.	Pigs and cattle	Eating 0.75 percent of animal's weight of green plant in a few minutes.	Prostration, inflamed stomach.
Death camas (species of *Zygadenus*).	Gravelly hills, depressions, and meadows in western half of United States.	Leaves and stems	Sheep and cattle	Eating 0.5 percent of animal's weight of green plant in a day.	Vomiting, frothing, and weakness.
Drymaria (*D. pachyphylla*)	Denuded areas in western Texas and southern New Mexico.	do	Cattle	do	Depression, weakness, inflamed stomach and intestines.
Dutchman's breeches (*Bekukulla cucullaria*).	In woods, eastern half of United States north of Georgia.	do	do	Feeding on plant, particularly in spring and early summer.	
Greasewood (*Sarcobatus vermiculatus*).	Somewhat alkaline fields in western part of United States.	Leaves	Sheep	Eating 1.5 pounds in a few minutes.	Depression, kidney lesions.
Horsetail, marestail (species of *Equisetum*).	Wet meadows throughout United States.	Tops	Horses	Eating the plant in hay	Weakness, craving for horsetail, diarrhea, loss of flesh, lack of control of legs.
Larkspur (species of *Delphinium*).	Mountains and plains throughout United States.	Leaves of young plants	Cattle	Eating 0.5 percent of animal's weight, especially of young plants, within a few minutes.	Weakness, trembling, constipation.
Loco (species of *Oxytropis* and *Astragalus*).	Plains and some mountain valleys, western half of United States.	Leaves and stems	Cattle, horses, sheep, and goats.	Feeding for several days or weeks on any of the locos.[1]	Constipation, craving for loco, rough coat, incoordination, and peculiar actions.
Lupine (species of *Lupinus*)	Throughout United States	Leaves of young plant and fruit.	Sheep and cattle	Eating 0.5 percent of animal's weight of green plant or fruit in a day.	Sheep: Nervousness with some species of lupine; depression with others. Cattle: Weakness and trembling.
Milkweed (broadleaf) (*Asclepias eriocarpa* and *A. latifolius*).	*A. eriocarpa*: dry valleys in southern half of California.	Leaves	Sheep	Eating 0.1 percent of animal's weight of green plant in a day.	Depression, weakness, inflamed stomach and intestines.
Milkweed (whorled or narrowleaf) (*Asclepias galioides* and *A. mexicana*).	*A. latifolius*: dry plains of Southwest; along ditches, in abandoned fields and dry places, Colorado to Mexico and California.	Leaves and stems	Cattle and sheep	Eating 0.2 percent of animal's weight of green plant in a day.	Incoordination followed by severe spasms.
Mountain-laurel (*Kalmia latifolia*).	Woods and hillsides	Leaves	Cattle, sheep, and goats.	Eating 0.4 percent of animal's weight of green plant in a day.	Salivation, vomiting, and weakness.
Oak (shin oak and Gambel oak) (species of *Quercus*).	Sand hills and lower mountains of Colorado, Utah, and Southwest.	Leaves and leaf buds	Cattle	Feeding largely on oak for 2 weeks or more, especially in the spring.	Emaciation, scabby nose, constipation, followed by diarrhea and weakness.
Oleander (common) (*Nerium oleander*).	Fields, roadsides, edge of woods in southern part of United States.	Leaves	All animals	Eating small quantities	Stupor, trembling, convulsions, paralysis, vomiting, and diarrhea.
Parry aster or woody aster (*Aster parryi*).	Dry flats of Wyoming	Leaves and stems	Sheep	Eating 1.25 pounds of green plant in a day when animals are hungry.	Weakness, prostration, rapid, weak pulse, increased urination, and cyanosis.
Poisonbean (*Daubentonia longifolia*).	Coastal plains of Florida and Texas.	Seeds	Cattle, sheep, and goats.	Eating small quantities of seeds.	Depression, diarrhea, and rapid pulse.
Poisonvetch (some species of *Astragalus*).	Mountains, foothills, and valleys of Intermountain States.	Leaves and stems	Cattle and sheep	Eating considerable quantities during a day's feeding.	Difficult breathing, nausea, and weakness.
Ragwort or groundsel (species of *Senecio*).	Throughout United States	do	Cattle and horses	Feeding for several days on one of the poisonous species.	Jaundice, scabby nose, discomfort, loss of appetite, uneasiness, and loss of flesh.
Rayless goldenrod (*Aplopappus heterophyllus*).	Fields along ditches in western Texas, New Mexico, and Arizona.	do	Cattle, sheep, and horses.	Feeding on the plant frequently for several days.	Marked weakness, trembling, especially after exercise.
Rubberweed (*Actinea richardsoni*).	Gravelly hills and flats in mountains of Colorado, New Mexico, Utah, and Arizona.	do	Sheep	Eating small quantities daily for several days.	Vomiting and weakness.
St. Johnswort (*Hypericum perforatum*).	Fields, waste places, and hills across northern half of United States.	Leaves	Animals with white areas.	Feeding on the plant and being in bright sunlight.	Sore, scabby areas on white skin areas, itching, rapid respiration.
Sheep laurel (*Kalmia angustifolia*).	Moist soil, hillsides, and swamps in Maine and New York to Georgia.	Leaves	Cattle, sheep, and goats.	Eating 0.2 percent of animal's weight of green plant in a day.	Salivation, vomiting, and weakness.
Sneezeweed (*Helenium hoopesii*)	Mountains, meadows, and valleys from Montana to Arizona.	do	Sheep and cattle	Feeding on the plant for 2 weeks or more.	Profuse vomiting and weakness.
Water hemlock (species of *Cicuta*).	Wet places throughout United States.	Roots and rootstocks	do	Eating very small quantities	Violent spasms.
Western azalea (*Azalea occidentalis*).	Moist places in Coast Range and Sierra Nevada Mountains of California.	Leaves	Sheep	Eating a few ounces of leaves	Salivation, vomiting, and weakness.
White snakeroot (*Eupatorium urticaefolium*).	Rich woods and ravines in eastern half of United States.	Leaves and stems	Cattle and sheep	Feeding on the plant for several days.	Marked trembling and weakness, especially after exercise.

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[1] Some poisonous species of *Astragalus* are not locoes.

U. S. DEPT. OF AGRICULTURE

INJURIOUS EFFECTS PRODUCED BY SOME PLANTS OR PARTS OF PLANTS

Plant	Location	Parts of plant that usually cause trouble	Animals most commonly affected	Conditions under which injury usually occurs	Characteristic effects
Alfalfa (*Medicago sativa*)	Throughout United States	Leaves and stems	Cattle and sheep	Feeding on green or wet plants, especially when animals are very hungry or unused to green feed.	Bloat.
Clover, alsike (*Trifolium hybridum*).	Great Plains to Atlantic, and Tennessee to Canada.	do	Cattle, hogs, horses, sheep, with white skin.	Feeding for some time on plant and being in bright sunlight.	Swellings and sores on white areas; jaundice and liver injury in horses.
Clover (species of *Trifolium*).	Throughout United States	do	Cattle and sheep	Feeding on green or wet plants, especially when animals are very hungry or unused to green feed.	Bloat.
Corn	Middle Western States	Stalks left standing in field	Cattle and horses	Grazing in some cornfields in late fall and winter.	Hemorrhagic septicemia, impaction, and acute poisoning.
Dallis grass (*Paspalum dilatatum*).	Southern States	Seed heads when infected with ergotlike fungus.	do	Grazing on plant infected with ergotlike fungus *Claviceps paspali*.	Trembling and nervous paroxysms during which animal may fall.
Johnson grass (*Sorghum halepensis*).	Widely distributed in United States.	Leaves and stems of growing plants.	do	Grazing in fields of young growth stunted by drought.	Difficult breathing, spasms, coma, death in a few minutes.
Potato (*Solanum tuberosum*)	Throughout United States	Green tops and young, green, or sprouting potatoes.	Cattle, horses, and pigs.	Eating green tops or green or sprouting potatoes in considerable quantities.	Diarrhea, loss of appetite, lack of coordination, trembling, thirst.
Sorghum (*Sorghum sorghum*).	Widely distributed in United States.	Leaves and stems of growing plants.	Cattle	Grazing in fields of young growth stunted by drought.	Difficult breathing, spasms, coma, death in a few minutes.
Sudan grass (*Sorghum vulgare* var. *sudanense*).	do	do	do	do	Do.

CONTROLLING LOSSES FROM POISONOUS PLANTS

Poisoning of animals from eating certain plants usually occurs when the more nutritious and palatable plants or other feeds are not available in sufficient quantities or in great enough variety to satisfy the animals' appetites or requirements. Most poisonous plants are unpalatable; therefore as a general rule, animals do not readily eat them in sufficient quantities to be seriously injured.

A few plants or parts of plants when fed under certain conditions occasionally are injurious to animals.

Poisonous plants vary greatly in the following respects: (1) The condition under which animals are poisoned by them, (2) the portion of the plant that is most poisonous, (3) changes in the toxicity of the parts of the plants during growth and in drying, (4) the susceptibility of different species of animals to being poisoned by them, and (5) the effects on the poisoned animals.

Some suggestions for preventing animals from being poisoned are as follows: Avoid overgrazing of pastures as the animals may be forced to eat poisonous plants, since the most palatable and nutritious plants may be killed out and the less palatable ones are given a chance to grow. See that animals are not forced, for prolonged periods, to eat a limited variety of feeds. When animals are hungry or have been on one type of feed, such as dry hay, for some time, do not turn them into a pasture where there are poisonous plants, especially when these plants are green.

The most effective method for the control of losses from poisonous plants, and one that has been used successfully in many cases, is the eradication of such plants from pastures or ranges where losses occur.

Where eradication of poisonous plants is impractical, it is necessary to work out a system of pasture and range management that will permit utilization of the forage crop without causing excessive livestock losses. This is largely a matter of preventing overgrazing. If a sufficient supply of desirable forage is available, less toxic material will be eaten.

The few toxic plants that are palatable, and forage plants such as the sorghums which become toxic only under certain conditions, create problems that are difficult to control. Generally, however, it is not safe for animals to have access to areas where such plants are available. The plants must be eradicated or the areas fenced off.

In many cases of plant poisoning, treatment of the affected animals is unsatisfactory and may have little effect. It is probable that most of the damage has been done by the time the animals are discovered to have been poisoned. The outcome in each case depends to a very large extent upon the amount of toxic material that has been eaten and assimilated. Treatment is usually directed toward eliminating any of the toxic substance that still remains in the digestive tract. In chronic poisoning, recovery may follow a change of feed, especially if green feed is available, and in all cases good care with plenty of water and the right kind of feed will do much to hasten recovery. About the only specific treatment is that described later for poisoning by the cyanogenetic plants, or plants that produce hydrocyanic acid. From the standpoint of economy, prevention is of far greater value than treatment and when properly carried out will pay good returns.

When pastures or ranges have been stocked to full capacity during normal years and no reduction in the number of livestock is made during drought years, it is advisable to supplement the usual forage with other roughage or concentrates in order to avoid injury to existing vegetation and losses of animals from poisonous plants.

Cyanogenetic Plants

The more important of the cyanogenetic plants include wild chokecherry (*Prunus virginiana*, *P. melanocarpa*, and *P. demissa*), sorghum (*Sorghum vulgare*), Sudan grass (*Sorghum vulgare* var. *sudanensis*), Johnson grass (*Sorghum halepense*), flax (*Linum usitatissimum*), and arrowgrass (*Triglochin maritima* and *T. palustris*).

There are a number of factors that influence the absorption of hydrocyanic acid from plants after it reaches the digestive tract, but the rate at which such plants are eaten and the amount of food already in the stomach are probably the most important.

Hydrocyanic acid is a rapidly acting poison and offers little opportunity for remedial treatment. Recent work has shown, however, that if the victim can be reached in time a combination of sodium thiosulfate and sodium nitrite given intraperitoneally (injected into the lining of the abdomen) or intravenously (injected into the veins) by a veterinarian is an effective remedy against doses of cyanide up to three minimal lethal doses (*5*)

When one animal in a group pasturing on plants that might be dangerous shows symptoms of poisoning the others should be removed from the pasture as soon as possible, since these cases usually develop quite rapidly.

PREVENTION AND TREATMENT OF BLOATING

Bloating, also known as hoven or tympanites, is a form of indigestion in which the rumen or paunch is distended by gases of fermentation. It occurs chiefly in cattle, though sheep and goats also may be similarly affected. It may be caused by hurried eating, gorging on a new kind of feed, or some undesirable quality in the feed. Legumes such as alfalfa and clover are much more likely to cause bloating than grasses. Therefore, stock should be well filled with dry feed such as good hay or some grass pasturage which is not likely to cause bloating, before being turned on such legume pasture. Pasture which is wet with dew or rain is particularly dangerous. Once cattle are put on a legume pasture it is best to keep them there and give them free access to some good dry roughage in a stack or hay rack. If they must be taken off the pasture long enough to be hungry before they go back, it is important that they be given a good feed before going back, especially if the pasturage is wet.

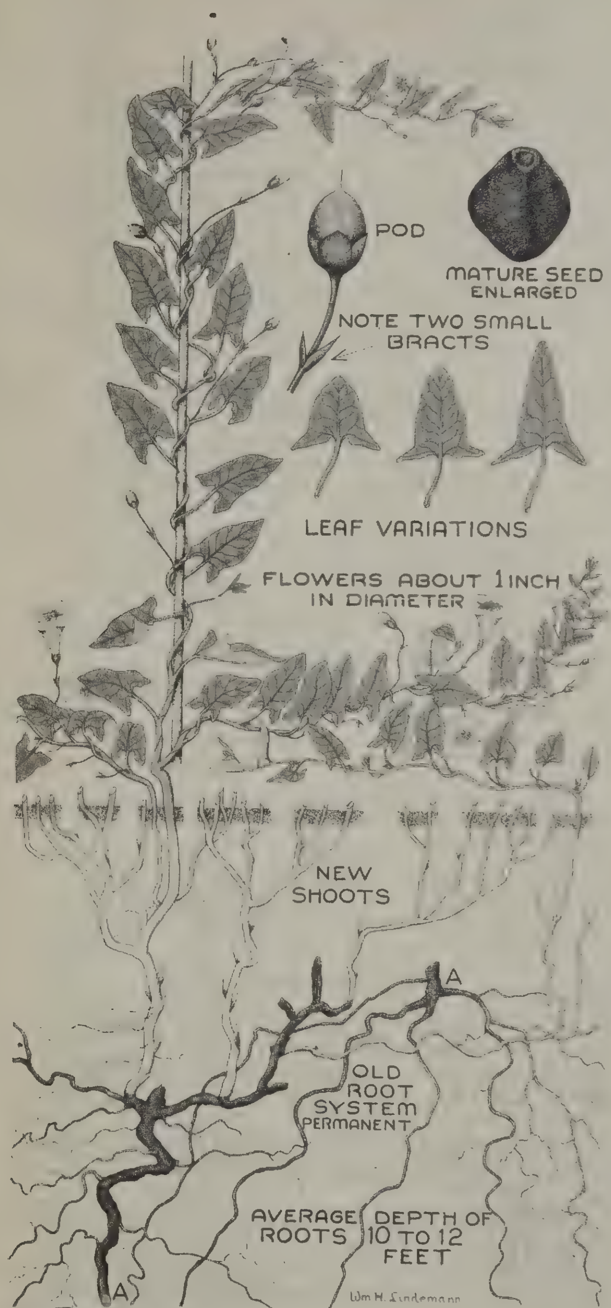
Remedies for mild cases consist in exercising the animal, throwing cold water on its sides, and putting in its mouth a bit coated with some disagreeable substance such as tar or grease. This stimulates the secretion of saliva and induces swallowing and the stretching of the esophagus, which allows the gas to escape. In severe cases when there is danger of death by suffocation, a trocar should be used to puncture the paunch. The insertion should be in the center of the triangular space below the loin between the last rib and the hip bone, on the left side, the trocar being directed downward, inward, and slightly forward. The canula, or sheath of the trocar, may be tied in place by a string around the body while the gas is escaping. Since puncturing the paunch with this instrument is attended by danger to the animal, if not properly done, the operation should preferably be performed by a qualified veterinarian, who also should prescribe treatment to stop the fermentation.

825.1

FIELD BINDWEED

CONVOLVULUS ARVENSIS

DIFFICULT TO ERADICATE


POD
MATURE SEED ENLARGED
NOTE TWO SMALL BRACTS
LEAF VARIATIONS
FLOWERS ABOUT 1 INCH IN DIAMETER
NEW SHOOTS
A
OLD ROOT SYSTEM PERMANENT
AVERAGE DEPTH OF ROOTS 10 TO 12 FEET
A
Wm H. Lindemann

Color chart furnished through courtesy of the University of Minnesota

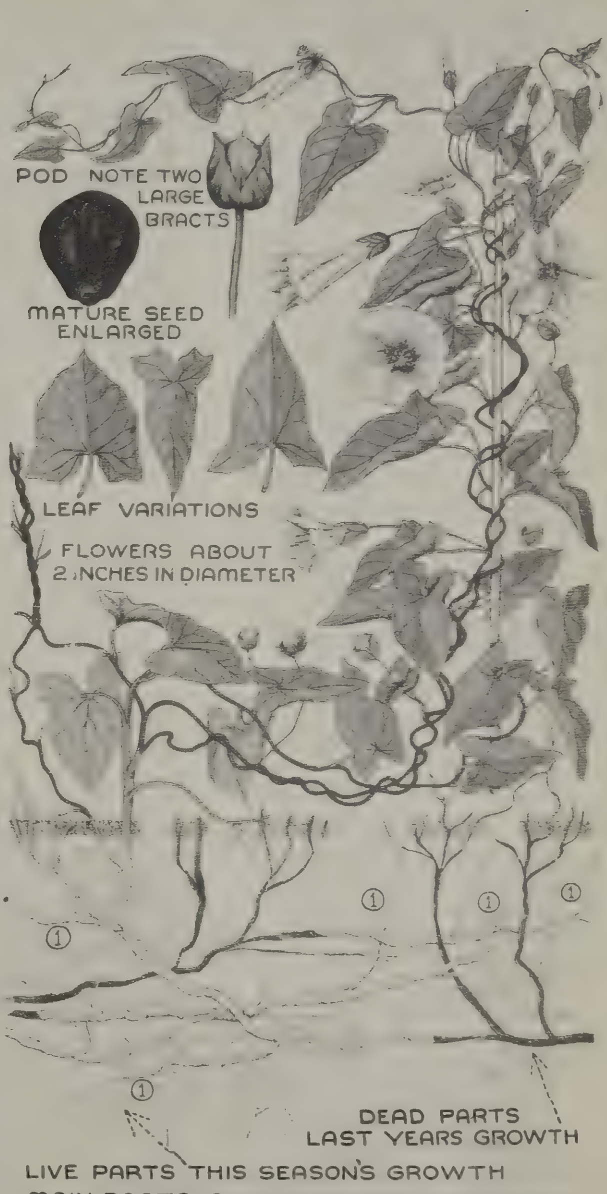
Field Bindweed is the most obstinate, rapid-spreading and persistent weed of Illi- It is a long-lived perennial growing prostate along the ground or twining around and over other plants and shading and choking them out. The roots store a large food supply, live for many years, and often penetrate to a depth of 16 feet, the average depth being 12 to 13 feet. These send up new shoots, often from a depth of several feet. These and horizontal stems near the soil surface spread the patches.

Control: Prevent field bindweed from becoming established on your farm by using clean seed. Two years of systematic cultivation with a duckfoot cultivator has been used with success. Use sodium or calcium chlorate on small patches.

HEDGE BINDWEED

CONVOLVULUS SEPIUM

QUITE EASY TO ERADICATE


POD
NOTE TWO LARGE BRACTS
MATURE SEED ENLARGED
LEAF VARIATIONS
FLOWERS ABOUT 2 INCHES IN DIAMETER
①
①
①
①
①
DEAD PARTS LAST YEARS GROWTH
LIVE PARTS THIS SEASON'S GROWTH

MAIN ROOTS AND UNDERGROUND STEMS USUALLY DO NOT GO DEEPER THAN ONE FOOT, DEVELOP IN LATE SUMMER, LIVE OVER WINTER, PRODUCE NEW PLANTS IN SPRING AND DIE IN THE FALL

Hedge Bindweed is also perennial but by no means so difficult to control as field bindweed. It has larger, sharper-pointed leaves and a larger flower than field bindweed, and the bracts are larger and are situated at the base of the flower. The roots grow horizontally, usually within six inches of the soil surface. The roots that live through the winter usually die after producing the new plant. The plant then produces new root stalks that produce new plants in the following spring.

Control: Use clean seed.

FIELD BINDWEED AND METHODS OF CONTROL

Field bindweed also known as European bindweed, creeping Jenny, or wild morning glory because of its ability to spread rapidly, crowd out all other types of vegetation, and survive under intensive cultivation, must be classed as a most dangerous and destructive weed. It has been a very serious menace to agriculture in such states as Kansas, Oklahoma, Nebraska, and Colorado for many years. In rather recent years it has become more serious in Missouri, Iowa, Illinois, Minnesota, Wisconsin, North Dakota, and South Dakota.

SPREAD OF BINDWEED

Bindweed is spread both by seeds and roots. Seeds are transported in farm seeds, feeds, threshing machines, road machinery, manure, drainage water and other similar ways. After plants become established in a field the roots are often dragged on farm implements to other parts of the same field or onto new fields.

ERADICATION

There are two practical methods of control available, namely, clean cultivation and chemical treatment. Either method entails loss of the use of the land for one or two seasons and is expensive—$40 to $60 per acre for chemicals, and $10 to $20 per acre for clean cultivation. . . .

Field bindweed can be controlled without the loss of a crop and with a positive annual income if the proper combination of crops and fallow or clean cultivations are employed. . . .

Clean Cultivation

1. Remove trash and plow at least 8 inches deep around May 15.
2. Clean cultivate, preferably with a duck-foot cultivator or duck-foot shovels on a regular cultivator every week to 10 days until October 15.
3. If land is subject to serious erosion, seed to rye that fall at the rate of 1½ bushel per acre.
4. Plow rye under the next spring May 1 and continue cultivations until plants are killed. (Last few plants can be spot treated with sodium chlorate when moisture conditions are right.)
5. Seed to wheat or barley the second fall, harvest grain crop, and clean fallow during the summer as required to kill seedling plants. . . .

It is necessary to prevent the plants from producing any considerable vegetative growth above the ground. This necessitates frequent and thorough cultivations. Each succeeding cultivation should be made at right angles to the previous one in order to bring about more complete destruction of the plants. This procedure should be continued from early spring until the weeds are eradicated.

Field bindweed is not usually eradicated in one year. Land which has been fallowed should be seeded to winter wheat, rye or some other grain in order to prevent erosion during the winter. The crop should preferably be pastured or harvested for hay early the following spring so that fallow cultivations may be resumed before the weed growth is large. Two years are usually sufficient for the eradication of most perennials. . . .

After the weeds have all been destroyed, clean cultivated crops or small grain crops permitting summer cultivation should be used until all danger of reinfestation from seeds in the soil is past. This danger exists for some five or six years.

CAUTION: Fields particularly subject to erosion may need to be terraced and cultivated on the contour to prevent ruination from erosion while clean cultivation is in progress. Erosion becomes more of a problem as continued cultivation destroys the organic matter.

Chemical Method

1. Mow weeds from area in July and again in August, if necessary, to make it possible to outline boundaries of infested area.
2. About October 1 apply 3 pounds (4 pounds if on fertile bottom lands or high organic matter soils) sodium chlorate per square rod in the dry form. (Do not apply when foliage is wet.) Be sure to apply chlorate 6 feet beyond the last bindweed plant.
3. Spot-treat the surviving plants about Sept. 15-Oct. 1.
4. Plant to small grain, harvest, and clean fallow the succeeding year if necessary to destroy seedlings.

Time of Application.—To be effective sodium chlorate must be in solution in the soil. This requires a rather high content of moisture in the soil. Since favorable moisture conditions are more likely to prevail in the fall than during midsummer, September and October are especially recommended as the best time of treatment.

Manner of Application.— Experience indicates that the chlorate can be applied in the form of a water solution sprayed on in one or more applications or spreading the dry chlorate over the infested area. Since the application of the dry chemical can be accomplished without any special equipment, reduces the fire hazard almost to the vanishing point, and is seemingly equally effective, it is the generally preferred method.

Follow-up Treatment.—Where treatments are made in September or October, no follow-up treatment is necessary or desirable until the succeeding fall. At this time the remaining plants should be individually treated with 1 teaspoonful of chlorate, or if it seems desirable, re-treat the whole area at the rate of two pounds per square rod. Crop sequence should be the same as recommended for clean cultivation.

WARNING Sodium chlorate in its pure form will not burn, however, when mixed with small amounts of dust or other finely divided organic matter, sulfur or charcoal, *it becomes a dangerous explosive* easily set off by shock or by heat.

1. If used as a spray wear rubber boots and old clothes which can be washed before they are allowed to dry. Do not spray weeds near buildings.
2. If applied in the dry form do not apply when the foliage is wet from dew or rain.
3. Do not remove sodium chlorate from the steel container while in a building.
4. Do not allow organic material such as seeds, chaff, paper or dust to become mixed with the chlorate.
5. Spray equipment should be rinsed thoroughly after use and all wooden containers, etc., should be washed off before they dry out.
6. Livestock probably should be kept away from treated areas until after a rain, although if they are receiving an abundance of salt they are not likely to eat enough of the chlorate to poison them.

Other Methods of Control

Ordinary salt applied at the rate of about 1 pound per square foot is a very effective treatment, yet it has the disadvantage of being expensive and having a very lasting bad effect on the soil.

Smothering is too difficult and on the whole too expensive to be practical. Bindweed will grow through several feet of straw, manure, or other similar material.

Pasturing small areas with hogs may kill out a small area but is not practical, because a small area can be cheaply killed out with chemicals.

Carbon bisulphide has worked very satisfactorily in an experimental way in the state but the expense of treatment is too high for all except special cases.

Certain acid arsenical sprays have shown some promise but not enough is known regarding them to justify their recommendation at this time.

Commercial borax applied in dry form at rates of 3 to 5 pounds per square rod have in experimental tests proven effective.

Apparently, borax like chlorate, leaves the land in condition that crops may not be grown for some time after treatments have been made. . . .

GENERAL WEED CONTROL PRACTICES

1. **Use clean seed**—Impure seeds often bring new and dangerous weeds to the farm. Sow only the best of seed and let the Indiana seed tag be your guide when purchasing.
2. **Rotate the crops**—Cultivated crops will act as a cleansing crop when properly tilled. This is especially true if the crop is planted in check rows. Plant crops best adapted for meeting the particular weed problems of each field.
3. **Utilize smother crops**—Alfalfa has been the most successfully used smother crop and will crowd out many weeds. Soybeans, buckwheat, sweet clover and sudan grass also have a place in the list of smother crops.
4. **Maintain soil fertility**—Strong, vigorous crops tend to crowd out weeds. Maintenance of soil fertility, so that a good stand of grass, grain or other crops can be grown, will mean fewer weeds.
5. **Apply proper cultivation**—The essential purpose of cultivation, after the seed bed has been prepared, is the eradication of weeds. The use of proper implements will make the job of cultivation more effective.
6. **Spray weeds**—Sodium chlorate can be used to advantage for the eradication of small patches of perennial weeds that resist other methods of control, such as field bindweed, Canada thistle, quack grass, perennial sowthistle and Johnson grass. It should be looked upon as a means of prevention rather than a cure after weeds become widespread.
7. **Clip weeds before they mature**—Weeds growing in fence rows, along roadsides and in waste places should be clipped before they mature. A single plant may produce sufficient seeds to infest an entire field.
8. **Guard against new weeds**—It is important to make frequent inspections of the farm to discover any new weeds that may have been introduced. Early attention to such weeds may prevent their spread.
9. **Cooperate with your neighbors**—Weed control is a community job, particularly when dealing with weeds producing wind blown seeds, such as Canada thistle and perennial sow thistle.

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Illinois Farmers Institute Bulletin
Indiana Bulletin 246

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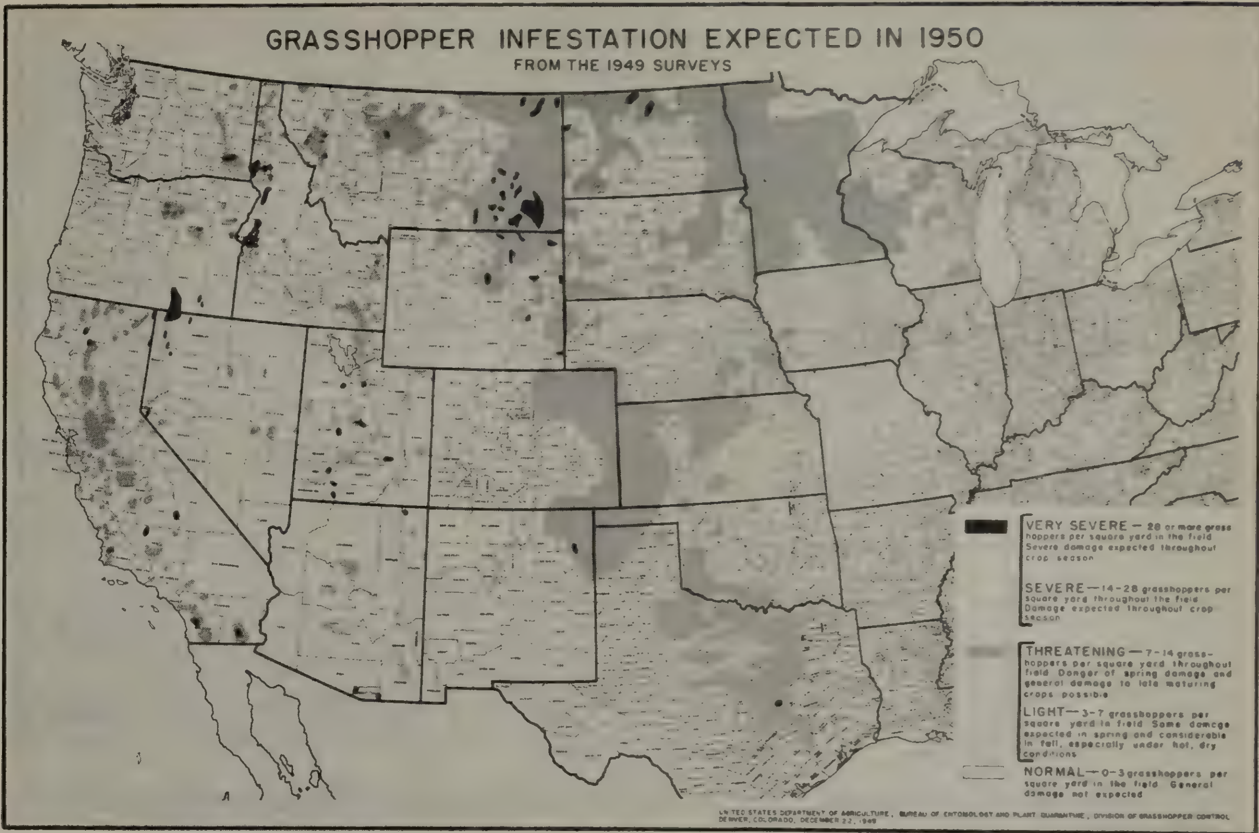
INSECT HAZARDS OF 1950


GRASSHOPPER INFESTATION EXPECTED IN 1950
FROM THE 1949 SURVEYS
VERY SEVERE — 28 or more grasshoppers per square yard in the field Severe damage expected throughout crop season
SEVERE — 14-28 grasshoppers per square yard throughout the field Damage expected throughout crop season
THREATENING — 7-14 grasshoppers per square yard throughout field Danger of spring damage and general damage to late maturing crops possible
LIGHT — 3-7 grasshoppers per square yard in field Some damage expected in spring and considerable in fall, especially under hot, dry conditions
NORMAL — 0-3 grasshoppers per square yard in the field General damage not expected

UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, DIVISION OF GRASSHOPPER CONTROL
DENVER, COLORADO, DECEMBER 22, 1949

GRASSHOPPERS

Grasshoppers may cause U.S. farmers serious trouble in 1950. Huge numbers of grasshopper eggs were found in many places during surveys made last fall by entomologists of the Bureau of Entomology and Plant Quarantine. Just how serious grasshopper outbreaks will be in 1950 depends primarily on weather conditions at hatching time, and the availability of green food for the tiny hoppers as they leave the egg beds.

Most likely trouble spots appear to be in Montana, North Dakota and Wyoming -- but farmers from Texas to Canada, and west to California may be forced to fight hoppers.

Farmers are being asked to check along fence rows, roadsides, and ditches, and to treat those areas when eggs are hatching.

CHLORDANE and TOXAPHENE are the poisons recommended to combat grasshoppers. Either one is effective. They kill more rapidly and continue to kill over a longer period of time than any previous control method (see Digest page 831).

HESSIAN FLY

Field surveys indicate that hessian fly infestations are moderate in southeastern Kansas, northeastern, central and southeastern Missouri, central and southern Illinois, Indiana, Ohio and New Jersey. Low infestations are generally present elsewhere in the winter-wheat belt from Colorado to the Atlantic coast and in California. Careful observance of the safe seeding dates is recommended, however, especially in the areas of moderate infestations.

EUROPEAN CORN BORERS

More European cornborers overwintered in the fields of the Corn Belt than ever before. Last year this insect caused crop losses estimated at around 350 million dollars. It will do even more damage in 1950 if weather is favorable at egg-laying and hatching time.

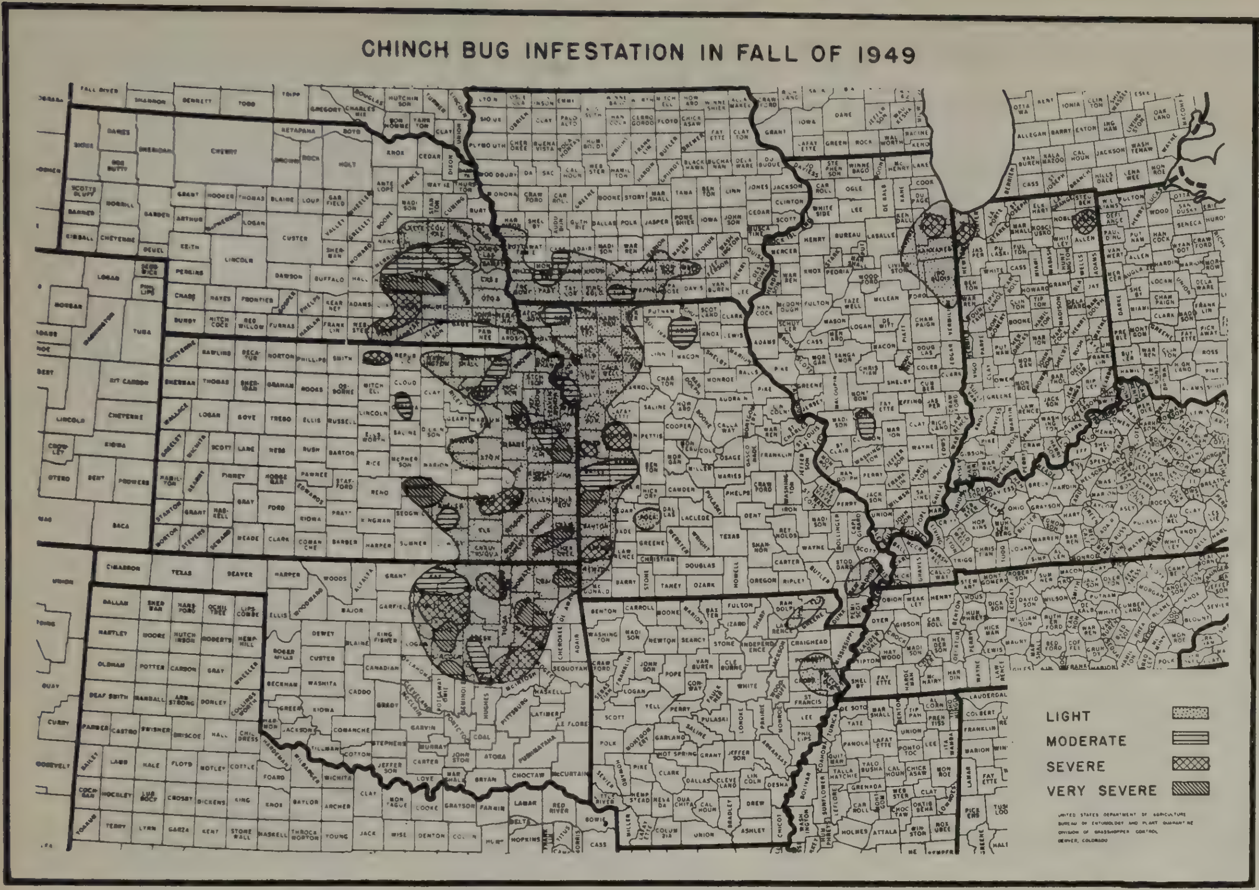
DDT and ryania are now recommended for control, but clean plowing and planting at the right time are still most important. (For further information, see Digest Page 837).

GREENBUGS

Greenbug outbreaks are now occurring. Favorable weather this past winter enabled the pests to infest many thousands of acres in Oklahoma and neighboring states. These insects have been increasing in numbers for the past two or three years.

Sprays or dusts containing parathion applied from airplanes or ground equipment have been found to give excellent control of greenbugs in cool as well as warm weather. In most states, where greenbug outbreaks occur, the state experiment stations or the extension service can advise farmers as to the need for, and timing of, treatment.

INSECT HAZARDS OF 1950


CHINCH BUG INFESTATION IN FALL OF 1949

LIGHT
MODERATE
SEVERE
VERY SEVERE
UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
DIVISION OF GRASSHOPPER CONTROL
DENVER, COLORADO

CHINCHBUGS

The map above indicates a continuing light infestation of chinch bugs in 1950. For those areas bothered by the insect, the University of Illinois recommends these three steps for efficient control:

(1) "PREPARE IN ADVANCE -- Watch grain fields for signs of infestation." Get barrier of creosote or dinitro dust ready well before migration starts -- 10 days to 2 weeks is not too early. (Digest Page 833).

(2) "BE PROMPT -- Complete the barrier as soon as the bugs start toward the corn -- don't ever let them get to the first row.

(3) "BE THORO -- Remove all clods and trash. Fill up cracks that could act as tunnels. Make good traps. Don't let dead bugs fill postholes -- keep them cleared out, patrol and repair the barrier regularly. Don't slop creosote or waste toxic acid."

Dinitro dust barriers are effective, but are more costly than creosote.

CORN EARWORM

Damage is worst in the South, where earworms feed on cotton too, and where the weather favors several broods. But a mild dry winter and a dry summer can bring serious damage in the Corn Belt.

Earworms may finally be under control if a new spray just announced by USDA lives up to expectations. Made up of DDT, mineral oil and water, it has kept worms out of 80 to 90 per cent of the ears in badly infested areas. The oil makes the DDT stick to the silks, and gets the worms before they reach the ears. There have been no bad odors or tastes from the oil, and no DDT has been found in the ears. But don't feed husks or leaves to milk cows or slaughter animals because of the DDT.

Two sprays should give control -- one after 7 to 10 per cent of the ears show silk -- the second 2 or 3 days later. Spray consists of 3 quarts of 25 per cent emulsifiable DDT concentrate, plus 2-1/2 gallons of oil, with water enough to make 25 gallons. Emulsion must be agitated when applied.

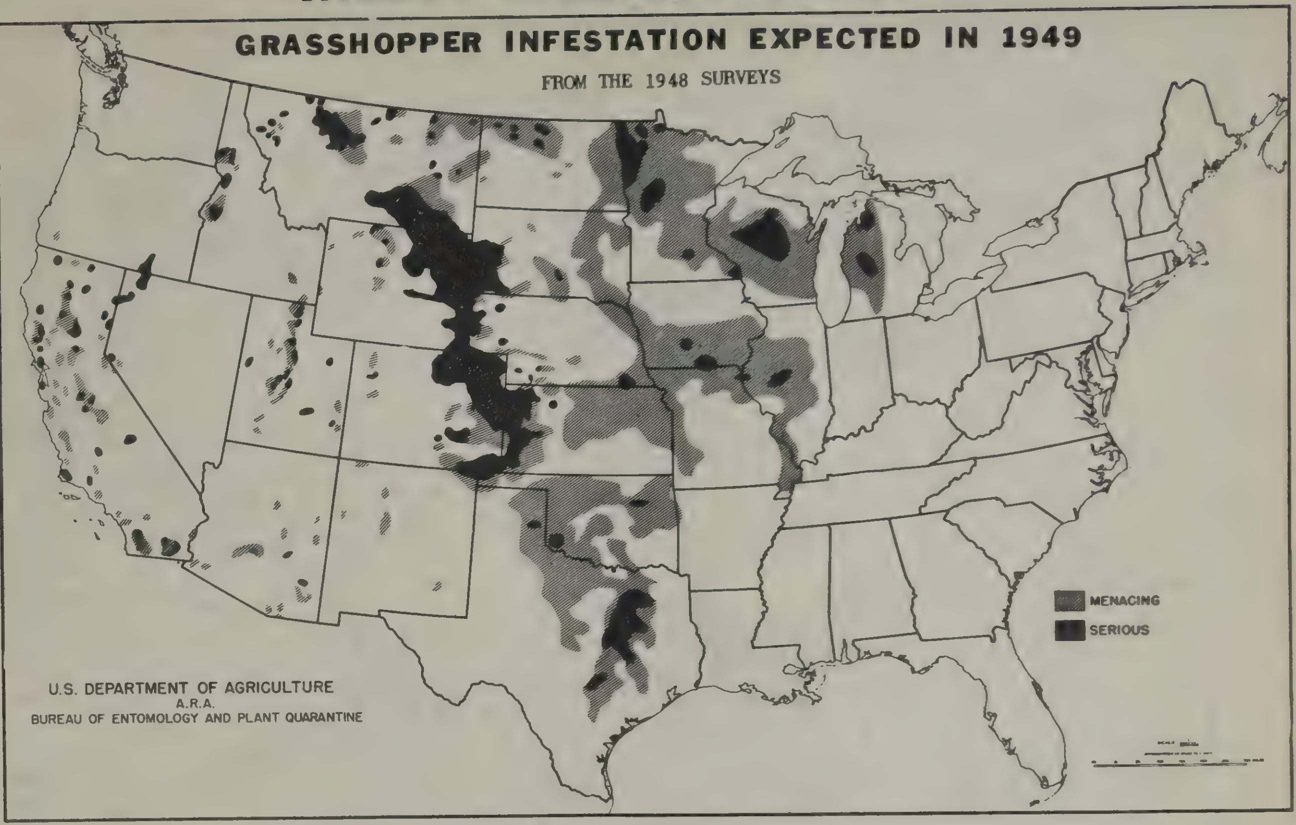
BOLL WEEVILS

Boll weevils went into hibernation in great numbers last fall. The mild winter enabled many of them to overwinter successfully, and probably they will enter 1950 cotton fields in record numbers. Infestation may be very heavy in Louisiana, Mississippi and Arkansas. Farmers should consult their county agent or the experiment station or extension entomologist in their state now for advice on control measures that may be needed later in the season.

NEW EXPERIMENTS IN INSECTICIDES

Experiment stations and universities are at present testing the possibilities of mixing chlordane and benzene hexachloride with fertilizer. At present it looks like a fairly effective way of combating corn rootworms, cutworms, white grubs, beetles and other underground pests. But this soil treatment could backfire and cause a lot of trouble. Scientists are proceeding with caution.

INSECT HAZARDS OF 1949


GRASSHOPPER INFESTATION EXPECTED IN 1949
FROM THE 1948 SURVEYS
MENACING
SERIOUS
U.S. DEPARTMENT OF AGRICULTURE
A.R.A.
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

GRASSHOPPERS

Heavy infestations of grasshoppers are expected this year. Grasshopper outbreaks tend to occur in 10 year cycles. The last heavy infestation was in 1940, and numbers have been steadily increasing for the past three years. Unless there is bad weather at hatching time, or unless parasites, predators, or disease reduce their numbers in early summer, this will be a bad year.

Clordane and Toxaphene are now recommended to combat grasshoppers. Either one is effective. They kill more rapidly, and continue to kill over a longer period of time, than any previous control method.

These insecticides are particularly effective when applied as sprays or dusts on growth along roadsides, railroads, canal banks, and field margins, or to crops such as alfalfa, young cotton or corn.

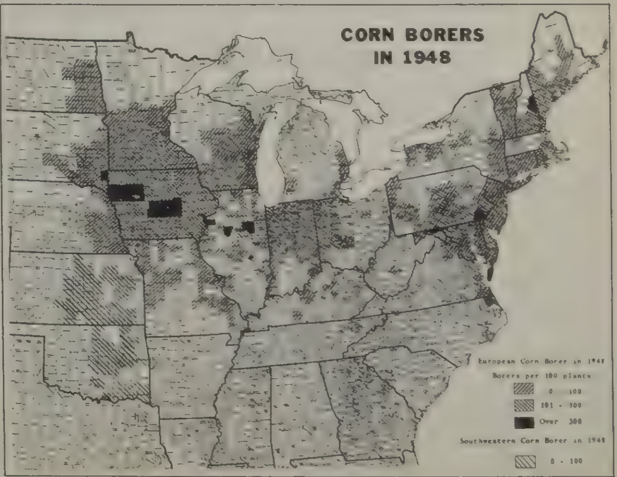
CORN BORERS-European and Southwestern

The European Corn Borer reduced the 1948 corn crop by 86 million bushels. Present value of corn lost is $103 million, based on $1.20 bu. corn. The borer infests the entire Corn Belt now. It can be found in nearly every corn field from New England to the Dakota's and from Virginia to Canada. A few borers were found in Louisiana recently.

Infestation by the Southwestern Corn Borer in Kansas and Oklahoma has not changed in boundary since 1947 but is slightly more intense.

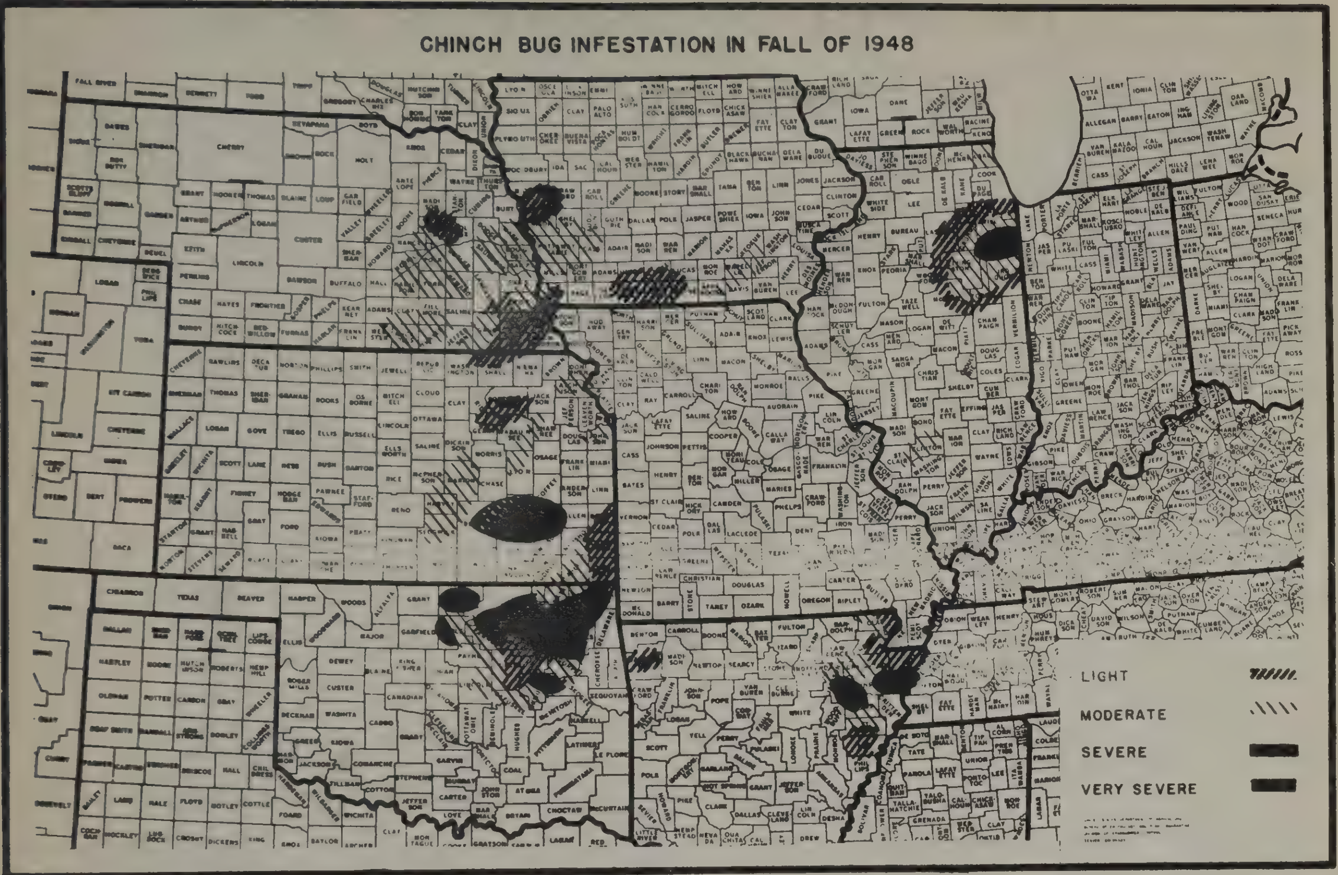
Clean plowing and delayed planting are musts in corn borer control. When a heavy infestation develops in spite of these measures, consider DDT. Here is the procedure as outlined by the Iowa State College.

1. "Make daily observations in the tallest, most vigorously growing cornfields. Examine fifty corn plants each in order to observe the first laid egg masses. Mark the plants on which first egg masses are found so that you can visit them later.



2. "Keep written records of the number of egg masses you find and their state of development.

INSECT HAZARDS OF 1949


CHINCH BUG INFESTATION IN FALL OF 1948

3. "When you count 12 masses for each 50 plants, then it's profitable to apply insecticides.

The cost of DDT treatments range from $2 to $5 per acre per treatment. It requires from 4 to 5 applications to give complete control. One application may be enough on field corn or hybrid seed corn to give good results, but complete control is desirable on sweet corn.

CHINCHBUGS

The map above indicates a continuing light infestation of chinchbugs for 1949. Populations which developed in 1948 were light in most areas of the central and midwestern states. Chinchbugs thrive in dry weather and the wet, cold fall and winter should keep infestation to a minimum.

The University of Illinois recommends these three steps for efficient control:

"PREPARE IN ADVANCE -- Watch grain fields for signs of infestation. Get the base of the barrier ready well before migration starts -- 10 days to 2 weeks is not too early.

"BE THORO -- Remove all clods and trash. Fill up cracks that could act as tunnels. Make good traps. Don't slop creosote or waste toxic dust.

Maps from U.S.D.A.

Dinitro-Dust barriers are time savers, but they are more costly than creosote and are easily destroyed by wind or rain. They have the advantage of killing the bugs.

WHEAT STEM SAWFLY

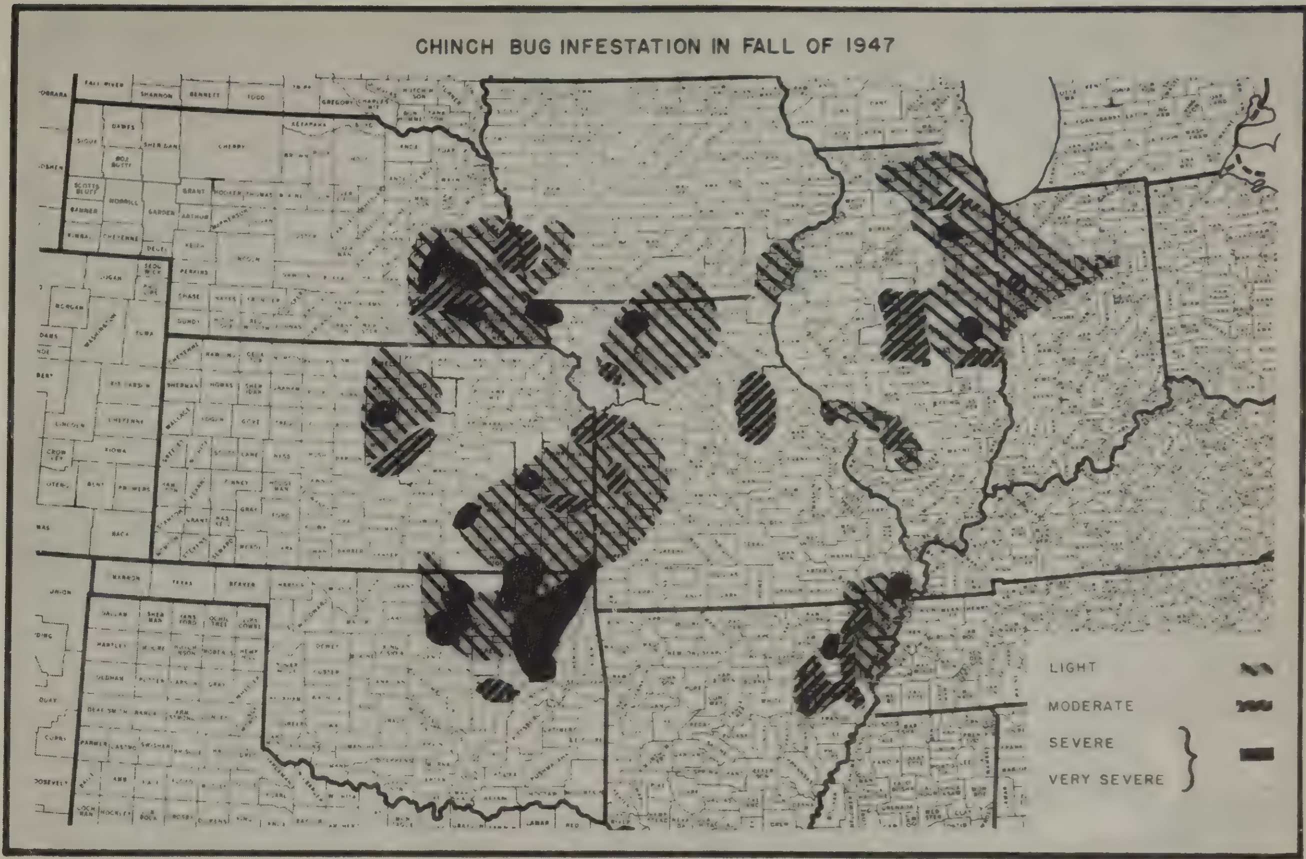
At the end of 1948, the most heavily infested areas were in northwestern North Dakota, northeastern Montana, and northwestern Montana east of the Rocky Mountains. A considerable area in North Dakota was heavily infested. Only Montana, North Dakota and northern South Dakota were surveyed and the infestation probably extends into Nebraska and Colorado, and possibly Kansas.

Control of the sawfly is based upon crop rotation and the use of resistant crops, such as Compana barley and Rescue wheat.

HESSIAN FLY

Field surveys indicate that Hessian fly infestations are low in California, and in a major portion of the winter wheat belt from western Kansas to the Atlantic coast. Moderate infestations are present, however, in sections of the Corn Belt and the eastern states. Moderate to heavy infestations are present in southwestern Iowa and New Jersey.

INSECT HAZARDS OF 1948


CHINCH BUG INFESTATION IN FALL OF 1947

CHINCHBUGS

Dry weather favors chinchbugs and the snow cover in certain areas of heavy chinchbug infestation last fall was favorable for survival. Therefore, damage could be more severe than expected.

The University of Illinois recommends these three practical steps for efficient control:

"PREPARE IN ADVANCE -- Watch grain fields for signs of infestation. Get the base of the barrier ready well before migration starts -- 10 days to 2 weeks is not too early.

"BE PROMPT -- Complete the barrier as soon as the bugs start toward the corn -- don't even let them get to the first row.

"BE THORO -- Remove all clods and trash. Fill up cracks that could act as tunnels. Make good traps. Don't slop creosote or waste toxic dust."

The new Dinitro-Dust barriers are time savers, but they are more costly than creosote and are easily destroyed by wind or rain. They have the advantage of killing all bugs on contact. (See Digest Page 833).

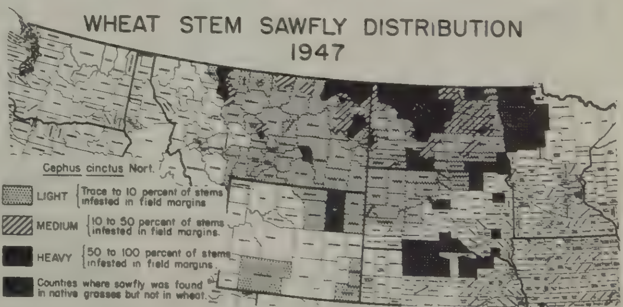
COTTON BOLL WEEVIL

The number of boll weevils surviving the winter was larger than last year in Texas and South Carolina, but less than in 1947 in Louisiana and Mississippi. The amount of damage caused by the boll weevil during 1948 will be determined largely by weather conditions during June and July, and the extent to which insecticides are used for their control in fields where they become abundant. (See Digest Page 835).

MEXICAN BEAN BEETLE

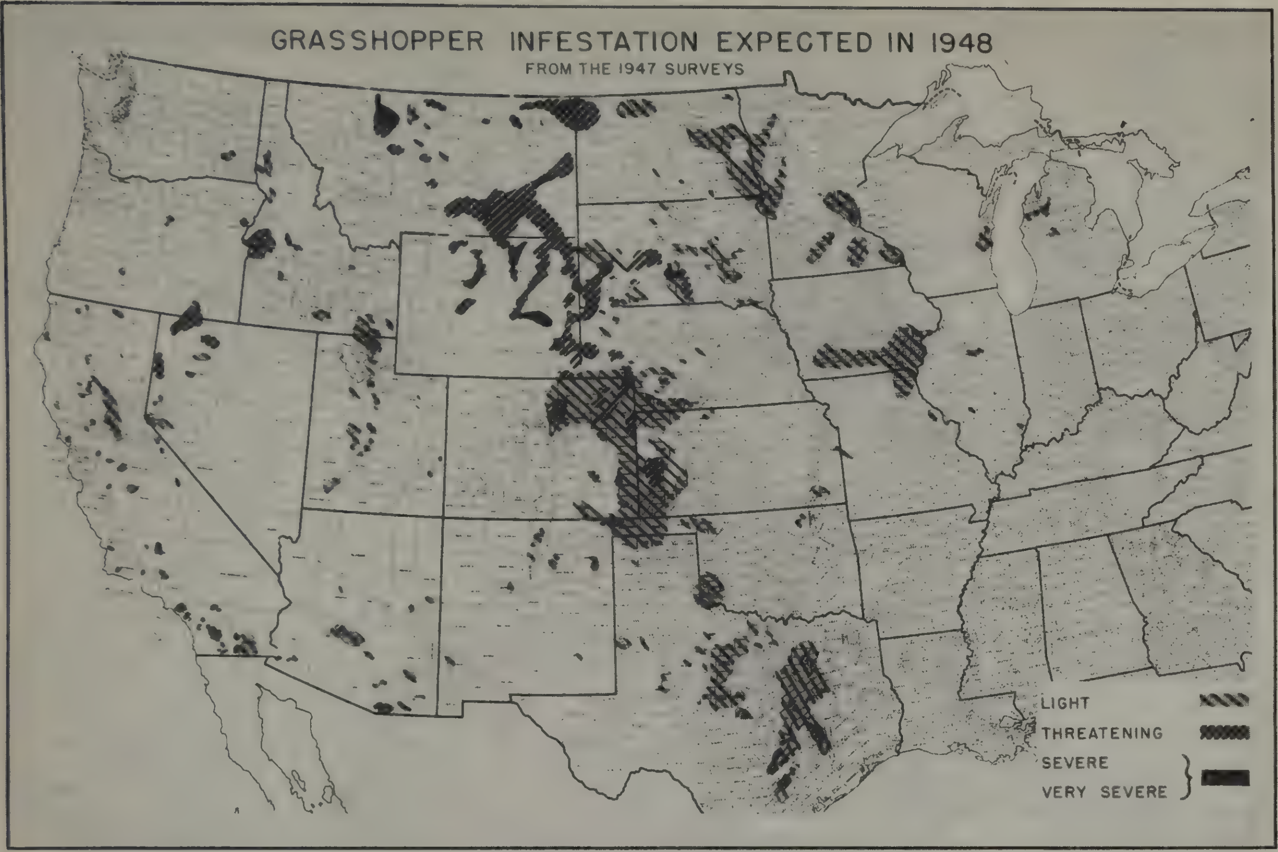
The Bean Beetle has spread to all important bean-growing districts east of the Mississippi. Sprays containing derris or cube powder in water are most satisfactory in the control of this insect. DDT is not effective. Cryolite cannot be used after the beans begin to form because the residue is poisonous.

WHEAT STEM SAWFLY


WHEAT STEM SAWFLY DISTRIBUTION 1947
Cephus cinctus Nort.
LIGHT {Trace to 10 percent of stems infested in field margins
MEDIUM {10 to 50 percent of stems infested in field margins.
HEAVY {50 to 100 percent of stems infested in field margins.
Counties where sawfly was found in native grasses but not in wheat.

By the end of 1947, the sawfly had infested nearly all of Montana east of the Rocky Mountains, all of North Dakota, northwestern Minnesota, much of Wyoming, North Central Nebraska and a section of South Dakota. It is probable that the infestation extends farther South into Nebraska and Colorado, and possibly into Kansas.

INSECT HAZARDS OF 1948



GRASSHOPPERS

Light to threatening infestation is expected this year in all states west of the Mississippi River, except Louisiana and Arkansas. Illinois, Michigan and Wisconsin also report light infestation. A few scattered areas in the North and in California expect severe infestation.

Chlordane and chlorinated camphene show promise as new insecticides for grasshopper control. They are more costly but give quicker control and continue to kill longer than the standard bait. (See also Digest Page 831).

MORMON CRICKET

Light infestation of Mormon Crickets is expected in small scattered areas of Washington, Oregon, Idaho, Nevada and Wyoming this year. Moderate to heavy infestation will also occur in all of these states but Wyoming, with a concentrated area expected in North Central Oregon. Control measures are similar to those for grasshoppers.

EUROPEAN CORN BORER

The European corn borer reduced the field corn crop of 1947 by at least 50 million bushels. This is nearly a $97,000,000 loss, suffered mostly in Illinois, Iowa, Wisconsin, and Minnesota.

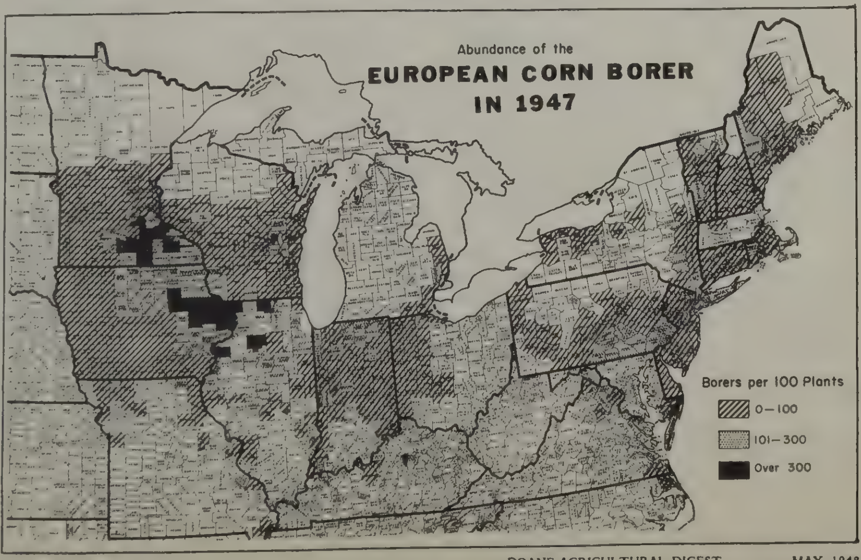
Clean plowing and delayed planting are musts in corn borer control. When a heavy infestation develops in spite of these measures, consider DDT. Here is the procedure as outlined by Iowa State College.

1. "Make daily observations in the tallest, most vigorously growing cornfields. Examine fifty corn plants each in order to observe the first laid egg masses. Mark the plants on which first egg masses are found so that you can visit them later.

2. "Keep careful written records of the number of egg masses you find and their state of development.

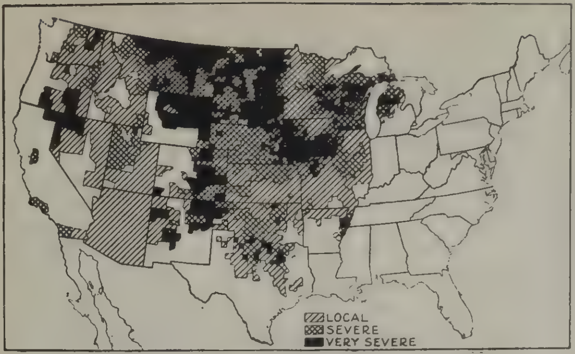
3. "When you count 12 masses for each 50 plants, then it's profitable to apply insecticides."

The cost of DDT treatments range from $2 to $5 per acre per treatment. It requires from 4 to 5 applications to give complete control. One application may be enough on field corn or hybrid seed corn to give good results, but complete control is desirable on sweet corn. (See also Page 837).



Maps from U.S.D.A.

GRASSHOPPERS



Areas where grasshopper outbreaks have occurred.

All grasshoppers are similar in habits and development. The eggs are laid in the late summer and fall, remain in the ground during the winter, and hatch during April, May and June. Normally there is only one generation a year, but in some southern states and during long hot summers, early-laid eggs may hatch the same year.

Chlordane and **Toxaphene** are now recommended to combat grasshoppers. They kill rapidly, and continue to kill over a long period of time. Both of these poisons are very effective when used according to instructions. Toxaphene costs about 30 to 40 per cent less than Chlordane per treatment. Chlordane will give complete protection for periods up to 3 weeks. Toxaphene gives protection for periods of 5 days to 2 weeks.

For best results, apply early to grasshopper "egg beds" -- the unplowed parts of the field. Plowing breaks up the egg masses and few grasshoppers hatch out in the plowed parts of the field. Spray or dust the abundant growth along roadsides, railroads, canal banks, and field margins, or on crops such as alfalfa, young cotton or corn while the 'hoppers are still small.

It is important to destroy the initial infestation of 'hoppers before they begin to spread out over the fields. A barrier strip applied to field margins is effective in preventing ground migrations into a field. A field wide application protects a crop against grasshoppers which fly into it. Only a small part of a given crop area need be treated for complete protection.

CAUTION!

1. DO NOT USE THESE POISONS ON FOOD CROPS, OR THOSE FED TO MEAT AND MILK ANIMALS. They may accumulate in the fat tissues or be passed into the milk like DDT.

Do not apply these insecticides to fruits or leafy vegetables when foliage or fruit that is to be used as food is on the plant, unless the residue can and will be removed by washing or stripping.

2. If 'hoppers get bad in alfalfa or other hay crops, cut the hay. Then spray or dust areas where the 'hoppers concentrate. Some operators leave two or three 6-foot strips of hay across each 20 acres. The grasshoppers concentrate on these and are easily killed. Grasshoppers frequently hatch in large numbers after the first hay crop has been removed. If this happens, spray or dust the second crop when it is 6 to 10 inches high.

3. Avoid applying these insecticides to legumes when in bloom. If control of grasshoppers becomes necessary at this time to save the seed crop, spray in early morning or late afternoon when bees are inactive. Sprays are less harmful to bees than dusts.

AMOUNTS TO USE PER ACRE

Sprays		Dusts	
Chlordane --	1 Pound	Chlordane --	1.5 Pounds
Toxaphene --	1.5 Pounds	Toxaphene --	2 Pounds

*These are dosages recommended for general use under a wide range of conditions. Early in the season, slightly lower dosages may be used effectively under some conditions. Later when vegetation is dry, slightly higher dosages may be required. They can be applied from ground equipment or from airplanes.

APPLICATION TABLE

This table shows the quantity of commercial strength Chlordane and Toxaphene to use to get a given amount of "actual" or technical poison.

Quantity	Type	Formula	Actual Poison
1 quart	Chlordane emulsified	45-47 per cent	1 pound
1 quart	Chlordane emulsified	73-75 per cent	2 pounds
1 pound	Chlordane wettable powder	50% by weight	½ pound
1 pound	Chlordane wettable powder	40% by weight	4 pounds
1 quart	Toxaphene emulsion	50% per cent	1 pound
1 pound	Toxaphene wettable powder	50% by weight	½ pound

In determining rates of application use the "actual" poison column. Various proportions of water or other carriers may be used to give uniform coverage depending on the equipment available but the amount of "actual" poison applied per acre must be maintained at the specified rate.

POISON BAITS

Baits are most effective after the crops have been damaged because the grasshoppers will eat the succulent growth in preference to the bait. However, there may be times when it will be more practical to use poison bait than to spray or dust.

Chlordane and Toxaphene can be used in baits but this is not recommended, because of costs and the relative ineffectiveness compared to spraying or dusting. Paris green, white arsenic, sodium pyroasenate and sodium fluride are some of the poisons commonly used in baits. Lead arsenate is not effective against grasshoppers.

MORMON CRICKET

The Mormon Cricket is similar to the grasshopper, although slightly larger in size. It attacks the same types of crops and does similar damage. The methods of control used on grasshoppers are equally effective on Mormon Crickets.

HESSIAN FLY

The Hessian fly attacks most wheat, barley, and rye, wheat being preferred. It does not develop freely in rye and has never been found in oats.

Once the Hessian fly gets in a wheat crop, there is no way known of stopping its injury to that crop. The only available control methods are preventive rather than remedial -- they must be applied before the crop is planted. These preventive measures are both effective and practical.

1. During the summer, plow under the stubble of last years' crops, if this does not interfere with crop rotations and the best farming practices.

2. Keep down all volunteer wheat. It serves as food for the flies emerging in late summer and early fall.

3. Have the seed bed in good condition and the land highly fertile so the wheat will grow rapidly.

4. Sow wheat late enough to escape the fall generation of the fly but early enough to withstand the winter. Sow wheat as rapidly as possible after the "fly free" date. Check with your county agent for the "Fly Free Date" in your area.

5. To be fully successful, it is necessary to have neighborhood cooperation in the control of Hessian fly. A single field of early sown wheat will often furnish enough flies to infest an entire locality the following spring.

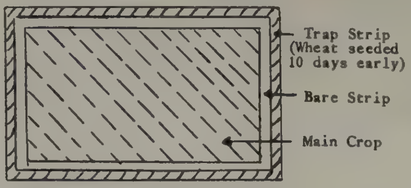
Since the fly can build up from low populations to extremely high and dangerous numbers within a single year, general adherence to safe seeding dates every year is essential if losses due to the Hessian fly are to be prevented.

WHEAT STEM SAWFLY

The Wheat Stem Sawfly is causing considerable crop losses in North Dakota and Montana. Spring wheat suffers most from this insect. Various native grasses, including quack and wild rye, are also attacked. Barley is occasionally infested. Sawfly control measures are not entirely effective by themselves, but when combined into a complete program, will usually offer fairly complete control. To control;

1. Drive out sawflies by using resistant crops such as flax, oats, barley and fall rye. Durum is much more resistant than hard wheat but may suffer some damage in heavily infested areas.

2. Trap sawflies in strips of wheat planted 10 days before the main crop. This is the chief means of killing sawflies. The trap strip should be 10 to 20 feet wide, placed between the old infested stubble and the new wheat crop with an adjoining 10 foot bare strip between the trap and the regular crop. The trap strip must be destroyed by thorough shallow tillage that tear out the plants by the roots.



GENERAL PLAN OF SAWFLY TRAP

Trapping reduces sawflies in two ways:

- The trap strip receives eggs which would otherwise be scattered through 5 to 10 rows of the crop.

- Each stem in the trap strip will have several eggs deposited in it, but only one sawfly larva will survive because the oldest one kills all the others.

3. Avoid excessive loss by harvesting infested fields early. The degree of infestation can be determined two or three weeks before harvest by splitting open straws from different sections of the field. Sawflies leave a sawdust-like material in the straw. If many straws are infested in certain parts of the field, early harvesting of those areas will avoid extensive breaking and lodging.

4. Kill some sawflies by tillage methods. Shallow surface tillage immediately after harvest brings the stubs of stems in which the insects winter to the surface. There the sun kills the larvae. But -- larvae will be killed only in stubs that are entirely exposed.

By plowing 6 inches deep, with the furrow well turned and packed, the stubs are buried deep enough to prevent the insects from emerging. Fall plowing is better than spring plowing. Shallow plowing has little effect on sawflies.

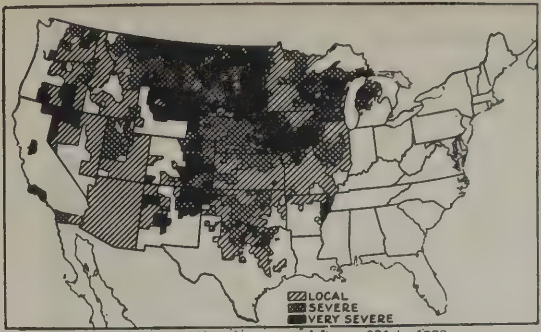
Stubble burning does not destroy sawfly larvae. They are too far below ground in the short stubs to be affected by the heat.

5. Use crop rotations. Do not seed wheat on a field where sawfly damage occurred the year before. Preferably, seed wheat only after clean summerfallow, or following an immune crop such as oats, barley or flax.

All these procedures should be used in severely infested areas and losses can be greatly reduced in a short time. Community cooperation is necessary for best results. Continued use of control methods is advised in areas where the Wheat Stem Sawfly is permanently established.

Sources: Purdue Bulletin 440 (Rev.)
North Dakota Agr. Col. Extension Circular A-94.

GRASSHOPPERS



Where grasshopper outbreaks occurred from 1931 to 1938.

The grasshoppers that attack crops have similar habits and develop in much the same way. The eggs are laid late in the summer and fall, remain in the ground during the winter, and hatch during April, May, and June. There is generally only one generation a year, but in more southern States and sometimes during unusually hot summers in the North early-laid eggs may hatch the same year they are laid. None of the species that attack crops are able to survive the winter in the Great Plains except in the egg stage. . .

A period of several favorable dry years may enable grasshoppers to greatly increase in abundance, which usually results in serious damage to cultivated crops. . .

NATURAL ENEMIES

Some of their more important enemies are flesh flies, bee flies, blister beetles, ground beetles, spiders, hairworms, rodents, birds, and diseases.

Ground squirrels, field mice, and other rodents eat grasshoppers and dig in the ground for their eggs. . . All birds, except the strictly vegetarian doves and pigeons feed on grasshoppers, and some eat the eggs after scratching them from the ground.

HOW TO CONTROL GRASSHOPPERS

Whenever grasshoppers increase to such numbers that control is necessary, main dependence should be placed on destroying the young and adults with poisoned bait and the use of tillage and seeding methods that either destroy the eggs or prevent the emergence of newly hatched grasshoppers from the ground. One method supplements the other, and both must be used if successful and economical control is to be attained.

Fungous and bacterial diseases at times destroy great numbers of grasshoppers . . . and have been known to terminate outbreaks.

POISONED BAIT

Paris green, white arsenic, sodium pyroarsenate, and sodium fluorid are some of the poisons used in grasshopper bait. In a dry form these chemicals should be used at the rate of 4 pounds in each 100 pounds of bran. In bait containing water, liquid (40 percent) sodium arsenite may be used at the rate of 2 quarts in 100 pounds of bran. Liquid sodium arsenite will not work in an oil bait.

Do not use lead arsenate, as it is not effective. . .

Oil bait

Bran	100 lbs.
Dry poison	4 lbs.
Fresh lubricating oil (SAE 20-30)	2 gals.

Wet bait

Bran, or bran 50 lbs.; sawdust 50 lbs.	100 lbs.
Poison (liquid sodium arsenite)	2 qts.
Water	10 gals.

Sweetened bait

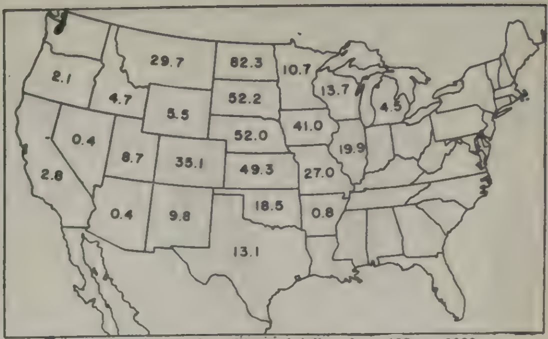
Bran	100 lbs.
Dry or liquid poison	4 lbs. or 2 qts.
Blackstrap molasses	2 gals.
Water	8 gals.

(Sawdust may be substituted for one-half of the bran, as in the formula for wet bait.)

Bait can be mixed by hand on an open floor, in a seed-treating machine, or in power machines such as feed mills or concrete mixers. For bait containing dry poisons (powders such as paris green), mix the poison and bran thoroly before adding the oil or the water-and-molasses mixture.

When liquid sodium arsenite is used, it should be added to the water and the poisoned water mixture added to the bran.

A well-prepared bait will have some poison on every particle of bran. Bait containing water may be prepared 48 hours ahead of the time it is to be spread. Oil bait may be mixed several weeks in advance of the time it is to be used and will still be effective.



Grasshopper damage in millions of dollars from 1929 to 1938.

DISTRIBUTING BAIT

The prepared mash should be thinly and evenly scattered over infested fields at the rate of 10 to 15 pounds (wet basis) per acre. It is most commonly spread by hand. . .

The best time to put out poisoned bait is while the grasshoppers are on the ground, doing their first feeding of the day. This occurs as soon after sunrise as the air temperature reaches 70° to 80° F., usually between 6 and 10 a. m., but if it is cold or cloudy early in the morning it may take place later in the day. The bait should not be scattered when the temperature is below 70° or above 85° or if there is prospect of rain within a few hours. Cloudy and windy weather are also unfavorable for feeding. . .

Newly hatched grasshoppers usually remain for some time congregated on their hatching grounds. If possible, they should be poisoned while they are still confined to these places or before they have invaded crops. While bands of young grasshoppers are migrating, good kills can be obtained by spreading strips of bait across their line of march. . .

In alfalta and clover fields, grasshoppers are usually distributed over the entire field. The most effective and economical baiting is done by leaving narrow strips of the crop uncut thruout the field. The grasshoppers will then leave the cut hay and concentrate in the uncut strips, where they can easily be poisoned.

In corn and soybean fields, feeding generally starts from the edges. Bait should cover the area where the grasshoppers are actually feeding and should extend for several rods beyond the infested area. Where fields of corn or soybeans are adjacent to roadsides or to clover, alfalfa, or small grain fields, several applications of bait at 5- to 7-day intervals may be necessary to kill the hoppers migrating from these areas. . . *Poisoned bait should never be put out either in piles or windrows.* . .

The full effect of a poison application will not be obtained in less than 3 to 7 days.

TILLAGE AND SEEDING METHODS

Good plowing with a moldboard plow to a depth of at least 5 inches is the best known method of preventing the emergence of young grasshoppers from the ground. . .

Shallow cultivation has long been recommended for the destruction of grasshopper eggs, but it has seldom given dependable control. . .

Seeding only on fall- or spring-plowed land, or on clean summer-fallowed ground is of vital importance in protecting small grain crops during grasshopper outbreaks

CATCHING MACHINES

Various kinds of grasshopper-catching machines . . . have been largely used in the past, but they are no longer recommended unless it is desired to save the grasshoppers for poultry food or fish bait. The poisoned bait is far more effective and is cheaper.

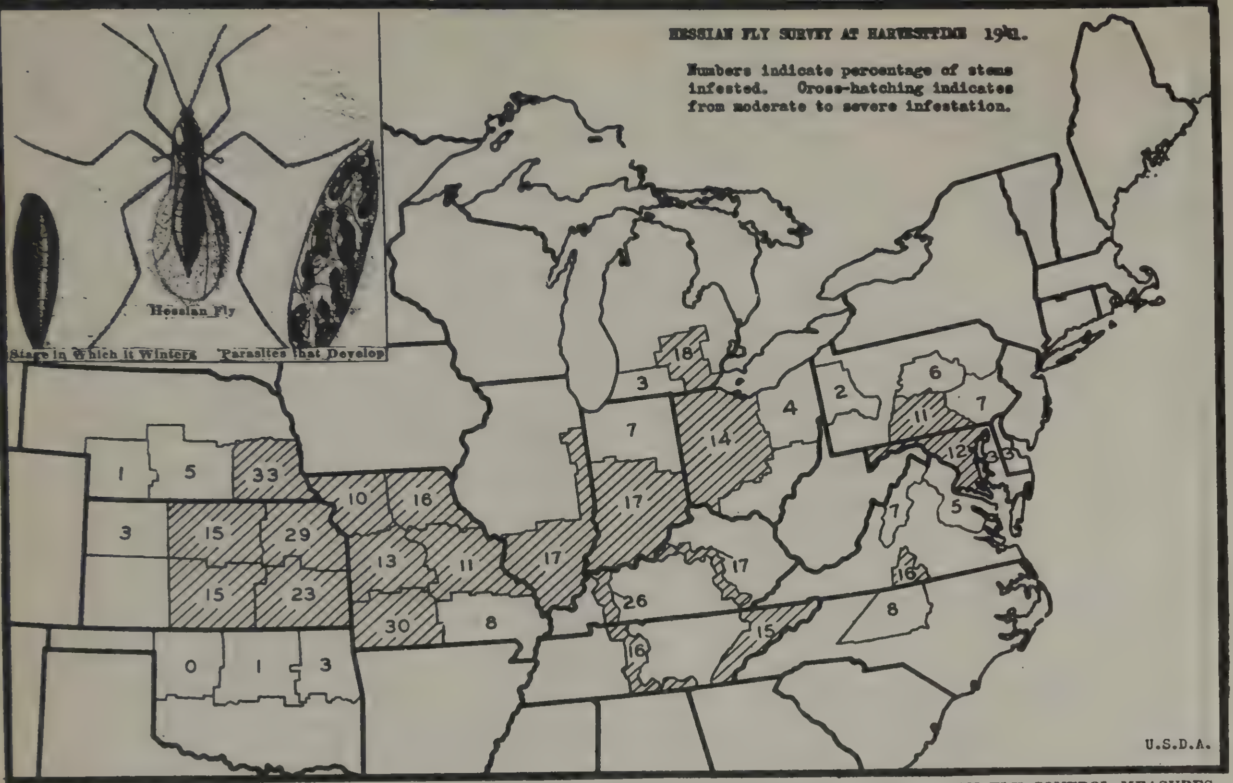
IMMUNE CROPS

Some of the sorghums, such as sorgo and kafir . . . , after reaching a height of 8 to 10 inches are practically immune to grasshopper attacks. They can be planted rather late in the season and provide valuable feed for livestock in areas where control measures have not been applied in time to save other forage crops.

CAUTION: *Everyone knows that arsenic is poisonous and that every possible precaution should be taken in using poison bait. Keep the poison out of reach of children and be sure that it carries a* **POISON** *label. In mixing, avoid inhaling the dry poison and do not get the liquid poison on your hands, face, or clothing. In scattering the bait, oiled gloves or grease on one's hands and under the fingernails will protect them. Make sure that the bait is scattered thinly over the ground and any unused poison bait must be kept out of reach of livestock. When properly mixed and properly scattered no harm to man, livestock, or wildlife will result.*

Farmer's Bulletin 1828; Cir. 466, U. of Ill.; Cir. 366, U. of Mo.

HESSIAN FLY


Hessian Fly
Stage in Which it Winters
Parasites that Develop
HESSIAN FLY SURVEY AT HARVESTTIME 1941.
Numbers indicate percentage of stems infested. Cross-hatching indicates from moderate to severe infestation.
18
3
6
2
4
7
11
7
14
12
3
3
1
5
33
10
16
7
17
5
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3
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13
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17
16
15
23
26
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30
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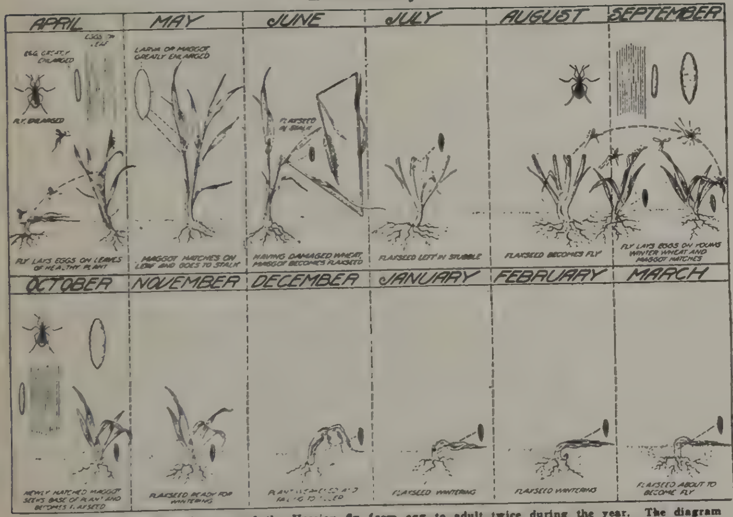
U.S.D.A.

Life History


APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
EGGS ON LEAF
EGG GREATLY ENLARGED
FLY ENLARGED
LARVA OR MAGGOT GREATLY ENLARGED
FLAXSEED IN STALK
FLY LAYS EGGS ON LEAVES OF HEALTHY PLANT
MAGGOT HATCHES ON LEAF AND GOES TO STALK
HAVING DAMAGED WHEAT, MAGGOT BECOMES FLAXSEED
FLAXSEED LEFT IN STUBBLE
FLAXSEED BECOMES FLY
FLY LAYS EGGS ON YOUNG WINTER WHEAT AND MAGGOT HATCHES
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
NEWLY HATCHED MAGGOT SEEKS BASE OF PLANT AND BECOMES FLAXSEED
FLAXSEED READY FOR WINTERING
FLAXSEED WINTERING
FLAXSEED WINTERING
FLAXSEED ABOUT TO BECOME FLY

Seasonal development of the Hessian fly from egg to adult twice during the year. The diagram shows the different stages of development and their position on the plant, the adults migrating from overwintering wheat plants to uninfested plants in the spring, and adults migrating from stubble to young plants in the fall. (After Webster.)

SUMMARY OF HESSIAN FLY CONTROL MEASURES

First: Plow under during the summer the stubble of the last crop, if such plowing does not interfere with the best crop rotations and agronomic practice. This is an important though often neglected means of fighting the fly.

Second: Keep down all volunteer wheat in so far as possible. The presence of volunteer wheat enables the flies emerging in late summer and early fall to lay eggs for a carry-over brood which will produce an infestation in the planted wheat the same fall and the following spring.

Third: Have the seed bed in good condition and the land in a high state of fertility so that the wheat will grow rapidly and vigorously. These measures will go far towards overcoming the objection to delayed sowing and the effects of moderate fly infestation.

Fourth: Grow strong-stemmed varieties of wheat which do not easily break over.

Fifth and Most Important: Sow wheat late enough so that it will escape the fall generation of the fly but early enough so that it will make sufficient growth to withstand the winter;

All preparations should be made so that the wheat sowing can be completed as rapidly as possible after the safe date has arrived.

Secure the cooperation of your neighbors so that no wheat is drilled before the fly-free-date. Get in touch with your county agent for information concerning the exact fly-free-date. Remember that the Hessian fly readily flies from one field to another and that a field seeded too early will be a center and a source of infestation for the entire neighborhood the following spring.

The Hessian fly has only one important insect parasite. This parasite is a small wasp which lays its eggs inside the host by stinging the maggot. Normally the maggot continues to grow and is able to develop the "flaxseed" or paparium. Here the parasite completes its work and destroys the host as shown in the insert. Control by this parasite is uncertain and cannot be depended upon to hold the Hessian fly in check when other control measures are neglected.

The Hessian fly is generally considered to be the most serious insect pest of wheat.

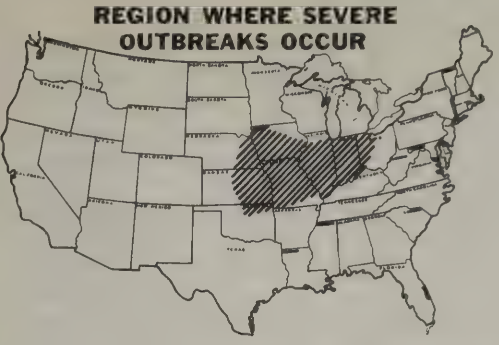
First noted on Long Island in 1779, the Hessian fly was probably imported with straw bedding used by Hessian soldiers during the Revolutionary War. It is now found throughout all of the principal wheat-growing sections of the plains states and on the Pacific Coast. (See Digest page 761) Outbreaks are apt to occur when one or more of the control measures outlined above is neglected.

Cir. 167, Purdue U.; Cir. 86, Iowa State Col.; U.S.D.A.

DOANE AGRICULTURAL DIGEST Released June, 1942

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

CHINCH BUGS


REGION WHERE SEVERE OUTBREAKS OCCUR

The chinch bug (*Blissus leucopterus* Say), a native insect of the western hemisphere, was first reported as a serious pest of wheat in North Carolina in 1785. Since then there have been many very serious outbreaks in the United States, particularly in the valleys of the Mississippi, Ohio and Missouri rivers. Some losses have also occurred in eastern Canada. The greatest injury, however, has occurred in the Corn Belt. . . .

The chinch bug . . . is a sucking insect that feeds entirely upon the sap of plants belonging to the grass family. Hence it can feed only upon green, growing, and succulent plants. Mature and ripening plants soon become unfavorable as food. Barley, oats, spring and winter wheat, rye, millets (including Hungarian grass), Sudan grass, corn (field, sweet and pop), sorghums, and broom corn are the principal crops attacked. It also feeds upon timothy, Kafir corn, bluegrass, prairie grasses, crabgrass, barnyard grass, and many other forage and wild grasses.

An outbreak usually originates in small-grain fields from which the insects migrate to nearby cornfields.

Habits and Life History of Chinch Bug

From about the first of November until about the middle of April the full-grown chinch bugs are hidden in various sheltered, protected places. They do not feed during this period and consequently do no damage. In April, May, and June, the overwintered bugs and their young are to be found in fields of small grain or tender, succulent grasses. It is during this period that the flight out from winter quarters occurs. . . .

Once in the fields the bugs feed for a time, and then start laying their eggs. The eggs are not all laid at once. A female lays 15 to 20 eggs in one day and may not lay again for several days. Mating and egg-laying usually go on for about a month, the young from the first-laid eggs often being nearly grown by the time the last eggs are laid.

By the middle of June most of the old bugs are dead. The first-hatched bugs are usually still in the immature stage, that is, they have not yet acquired wings. When the small grain dries up or is cut, they migrate on foot to fields of corn where, in the latter part of June and July, they very shortly acquire wings. A general flight then takes place, and the bugs scatter over the cornfields, usually picking the thinner stands of corn in order to avoid dampness and shade.

During July, August, and September the bugs from the first brood remain in the cornfields, where the second brood is produced. The flight from the cornfields to winter quarters starts about the last of August and is completed during the first part of November or earlier.

Weather Controlling Factor in Chinch Bug Abundance

. . . Heavy rains in the early spring may have little or no effect on the bugs, but frequent heavy rains during the last half of May and June will reduce infestations, and even in years of greatest abundance will keep down the numbers to a point where no serious damage will occur. The rain beats the young bugs down into the ground and "muds" them in so they die. Also dampness and high humidity are favorable to the spread of the white fungous disease which attacks the insects.

Again, if a period of very wet weather occurs in August, starting about the first of the month and continuing thruout the month, the second brood of chinch bugs will be greatly reduced and usually this means no damage the following year.

Contrary to common belief, winter weather usually has little effect on chinch bugs. . . . . Studies covering the last twenty years show that the mortality of the bugs in their winter hibernating quarters runs only from about 6 to 10 percent.

Immune Crops — Resistant Varieties of Corn

Of all methods of fighting the chinch bug, the cheapest and most effective is the use of crops that are immune to attack. . .

The chinch bug has never been known to develop on any plant that did not belong to the grass family and, so far as is known, no member of the grass family is chinch bug proof.

. . . Small grains ranked in about the order in which the chinch bug chooses them, are: *barley, spring wheat, spelt, wheat, oats,* and *unpastured rye.* . . .

The larger growing grass crops are favored by the chinch bug in the following order: *Sudan grass, millet, corn, sorghum, broomcorn, and grain sorghum.* . Much progress has been made in the development of hybrid corns distinctly resistant to second-brood chinch bugs. The best of these hybrids are much more resistant than the open-pollinated varieties.

Planting Practices

Grass in Corn Is of Some Benefit.—Weeds of the grass family growing in a cornfield serve to some extent to protect corn plants from chinch bugs. . . .

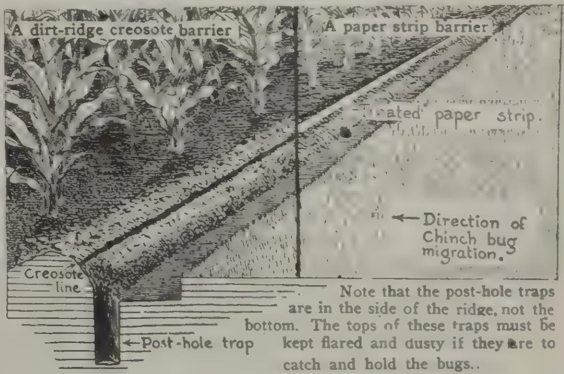
Thick Planting of Corn Desirable.—In thickly planted corn chinch bugs do less damage than in thin plantings. In areas where chinch bugs are numerous it is therefore recommended that corn be checked a little thicker than under normal conditions.

Chemical Barriers

Barriers are used to prevent the migration of chinch bugs from fields of small grain or grasses, where the first-brood bugs have hatched, to fields of corn or uninfested small grains. .

The best materials for barriers are those that have a strong odor of creosote, cresylic acid, or naphthalene. .

One of the most common methods for constructing a ridge is to plow a furrow around the field, throwing the dirt toward the corn. Smooth the furrow down with the back of a spade or section of harrow or plank drag. . .



Note that the post-hole traps are in the side of the ridge, not the bottom. The tops of these traps must be kept flared and dusty if they are to catch and hold the bugs..

Placing the Repellent Material.—Always bear in mind that creosote or paper barriers must be placed at *the top* of a ridge or slope.

Creosote Barriers on Dirt Ridge.—Thirty-five to 50 gallons of creosote, naphthalene drain oil, or other effective material is usually required for a line a quarter of a mile long. . . .

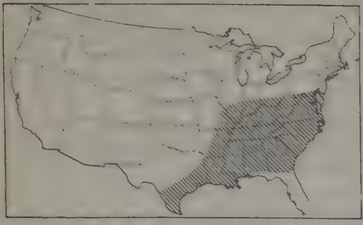
All barrier materials will have to be renewed at least once a day for the first several days. In renewing them, try to apply the material on the same path. .

. . . *Treated Paper Barriers.*—Judging by experimental work in Illinois . . . not over 30 gallons of creosote will ordinarily be required to maintain a quarter of a mile of paper-strip barrier for the season. . . . Once the paper is in place it should repel the bugs for two or three days if it has been properly treated. Then it will have to be freshened by the addition of more creosote. This should be done by applying the creosote to the top edge of the paper on the side towards which the bugs are coming. . .

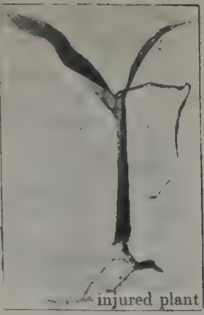
Advantages of Treated Paper Barriers.—Paper-strip barriers hold advantages over ordinary creosote dirt barriers in several respects: they are more effective, somewhat cheaper, and require less frequent attention in operation.

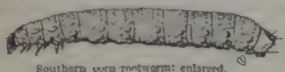
Iowa State College, Cir. No. 199; U. of Illinois, Cir. No. 431

SOUTHERN CORN ROOTWORM



The shaded areas on this outline map of the United States show the region where corn is most seriously injured by the southern corn rootworm.





Southern corn rootworm: enlarged.

The southern corn rootworm is commonly known as the "budworm"; in fact, few farmers know it under the former name. It is also sometimes termed "drillworm." These names are more or less descriptive of the injury done to the plant by the grubs. The adult, or parent, is known as the 12-spotted cucumber beetle, from the fact that it has 12 black spots on its back and is often a serious enemy to cucumbers and allied plants.

The southern corn rootworm is found throughout the greater part of the United States, from Maine to Florida and from the Atlantic coast to the Rocky Mountains. It occurs also in Mexico and Canada. It is not recognized, however, as a serious enemy of corn north of Maryland and the southern parts of Ohio, Indiana, and Illinois, south of Georgia, or west of the Mississippi River, with the exception of parts of southeastern Missouri, eastern Arkansas, southeastern Texas, and Louisiana.

The western corn rootworm occurs from Maine to the Gulf of Mexico and westward to Minnesota, South Dakota, and New Mexico.

In the States bordering the Pacific occurs a closely allied species. This western rootworm is often injurious to various cultivated crops. In southern Texas there is still another species, the belted cucumber beetle, which sometimes does practically as much damage to corn in that region as the southern corn rootworm.

WHEN SERIOUS INFESTATIONS MAY BE EXPECTED.

Serious infestations of the rootworm may be expected during seasons of abundant rainfall and cool weather, conditions conducive to the development of this insect. Corn in lowlands is more seriously affected than that in uplands, as this insect prefers to breed in moist soil. Thus it is only during years of heavy infestation that corn in uplands is subject to serious damage. . . .

HOW INJURY TO CORN BY THE ROOTWORM CAN BE RECOGNIZED.

When young corn has been damaged by this insect the fact can be easily detected. The bud leaves of injured plants, having been cut off from the main plant, dry up and die . . . while the rest of the plant retains its original color for a time. Subsequently the whole plant dies if injured badly. It is on account of this peculiar manner of injury that the insect is often called the "budworm."

Larger plants when attacked present a sickly yellowish and dwarfed appearance, due to the fact that the worms are feeding on the roots. Very often such plants exhibit a number of suckers, and they produce little or no grain.

DEVELOPMENT.

The southern corn rootworm has four distinct stages through which it passes in development. The first is the egg, the second the worm or larva, the third the pupa or transformation stage, and the fourth the adult, parent, or beetle.

WORM OR LARVA STAGE

The worm . . ., or larva, is slender and yellowish-white, with a dark-brown head and a dark patch on the top of the last body segment. It tapers toward the head end, the last few segments of the body being much wider than the head, which makes them appear as if swollen. It is quite active, even when young, and it is only with great difficulty that it can be captured when crawling about in the soil. When just hatched from the egg it is so small that it is barely perceptible to the unaided eye, but when full grown it can be seen readily, as it is then about one-half inch in length.

BEETLE STAGE

The adult or beetle . . ., the egg-laying stage of the insect, is about one-fourth inch long, yellowish-green, with a black head and legs and, as previously stated, with 12 black spots on the back. These spots are irregular in outline and generally somewhat separated.

NATURAL ENEMIES.

NATIVE BIRDS.

A number of our native birds prey upon the adults, or beetles, of the southern corn rootworm. Some of the common ones are the bobwhite, red-headed woodpecker, nighthawk, cardinal, kingbird, and phœbe. Of these birds the bobwhite deserves special mention. As many as 12 of the beetles have been found in the stomach of one bobwhite.

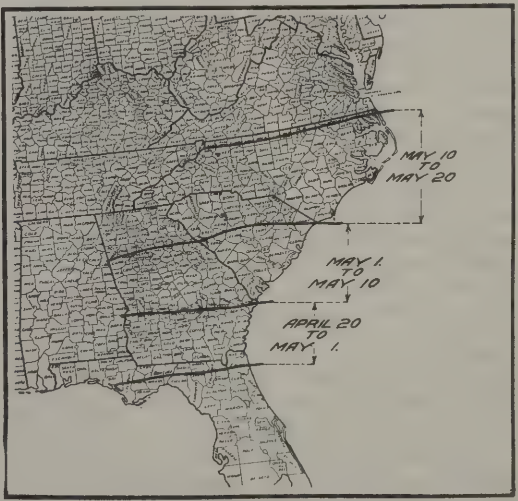
INSECTS

The southern corn rootworm has only a few insect enemies, the chief one being a two-winged fly . . . which attacks it in the beetle stage. This fly places a maggot, or larva, in the abdomen of the beetle, and the maggot feeds on the vital organs of the host and finally kills it. After the death of the beetle the parasite larva, being full grown, enters the ground and forms a tough, leathery case in which it passes into the next or pupa stage. This case, termed puparium, is dark and covered with needlelike spines. From the puparium there emerges in due time the adult, or fly, which starts the cycle again. This parasite is not very common and thus far has not played a very great rôle in the destruction of the pest.

PREVENTIVE AND OTHER CONTROL MEASURES.

(1) To prevent serious injury to corn from the southern corn rootworm, lowlands in southern Georgia and western Florida should be planted between April 20 and May 1; in central Georgia and the southern half of South Carolina, between May 1 and May 10; in northern Georgia, the northern half of South Carolina, and all of North Carolina, between May 10 and May 20. If it is possible to avoid it, plant no corn in the lowlands in this region during April. If possible, plow lowlands early in the season, at least 1 month before planting to corn.

In each locality the safe planting periods naturally will vary somewhat from year to year, depending on seasonal weather conditions. Plantings made very early in the season occasionally escape damage, but on account of the danger from frost it is not advisable to plant low grounds as early as this. Furthermore, it is seldom possible to make an early planting. The soil in the lowlands at this time of year is often too wet to permit plowing and a good preparation of the seed bed.



Periods during which corn should be planted in order to escape injury from the southern corn rootworm.

(2) Destroy beetles by burning over field borders and terraces in winter.

(3) Plant low places in fields twice as thickly as the uplands. Thin out later if necessary.

(4) Enrich the soil. Raise leguminous crops; these add humus and nitrogen to the soil.

It has been found that lowlands supplied abundantly with animal fertilizers are more seriously affected by these worms than those not so treated. It is well to make use of commercial fertilizers in such cases. This does not, as believed by some, repel the insects, but affords a less favorable breeding place for the pest.

(5) Plant profusely rooting, hybrid corn varieties in areas where root damage is severe.

FARMERS' BULLETIN 950.

COTTON BOLL WEEVIL

Whether or not to poison for boll weevils is no longer a matter for argument. Either most cotton farmers do -- or else they don't make a cotton crop. Control costs money, and adds to the production cost, but the only alternative to a control program is risk of total loss of the crop along with the income from it. The destruction of cotton by insects, chiefly the boll weevil, is tremendous -- estimated at one bale out of every 7. A 470 million dollar loss for the 1949 crop.

The adult is a grayish-brown snout beetle about one-fourth inch long, and feeds on squares, bolls or terminal buds. Punctures are made for feeding or egg laying. The egg hatches in about 3 days into a white larva or worm. This larva feeds inside the square or boll, becoming full grown in 7 to 12 days, passes from 3 to 5 days as a pupa, and then emerges as a weevil. Weevils hibernate mostly under leaves and trash, along ditch banks near the previous year's cotton fields.

Recommended insecticides, properly applied give effective control, but it is advisable to follow good farming practices to fight this pest. Cutting the green stalks before frost helps hold down the weevil population. Correct planting, fertilizing and cultivating helps to keep a rein on the boll weevil in the spring.

(Enlarged)

Courtesy Hercules Powder Company
Wilmington, Delaware

HOW TO DUST

Poison dust may be applied at any time of the day or night when the air is calm -- usually applied late at night or early in the morning. A heavy dew is not essential for satisfactory dusting conditions, but the air should be calm. Dust can be applied with any type of ground equipment, such as hand dusters, horse-drawn cart dusters, tractor operated dusters or by airplanes. Most common is the power take-off dusters on tractors that cover from 4 to 8 rows at a time.

If dust is applied by an airplane, the plane must be flown just above the cotton plants and the swaths should not be wider than the wing-spread of the plane, usually 30 to 40 feet. Control will be disappointing if pilots are permitted to dump large quantities of dust on a few rows in the field and make wide swaths.

Applications should be made until the infestation is brought under control. Normally, this requires 3 to 6 applications. Watch fields closely and resume poisoning when reinfestation occurs. Presence of insects and weather conditions will determine the total number of applications. Do not stop too early.

WHEN TO START POISONING

Normally, most states recommend that poisoning be started when 15 to 25 per cent of the squares are punctured. In years when large numbers of weevils have gone through the winter, earlier poisoning is often better. Start treatments as soon as squares get about the size of BB shot. Reason for early poisoning is that nearly 90 per cent of the crop comes from fruit set within 5 weeks after the first blooms appear. This way you go after the weevils at the time they can do the most damage.

In some areas, the most effective control program is to "kill 'em before they get started". This means using insecticides on the young cotton plants prior to the first blooms. However, the bulk of the poisoning is done in mid-season after squaring begins. Examine the fields, if as many as 15 to 25 per cent of the squares are punctured, it's time to start poisoning.

To determine per cent infestation, walk across each 5 acres of cotton and pick 100 unflared squares. The number of these punctured is the per cent infestation.

WHAT TO USE

In general, the following materials will give satisfactory control of boll weevils. For individual farms, the recommendations of your own college and manufacturers of the insecticides should be followed. Failure to follow directions is a frequent cause of ineffective insect control and waste of poison and money.

① BHC-DDT -- A mixture containing 3 per cent gamma isomer of benzene hexachloride (BHC) and 5 per cent DDT (3-5 mixture). Use at the rate of 10 pounds per acre at 5-day intervals. If washed off by rain in 12 hours, repeat application. Some mixes have 40 per cent sulphur. This is not necessary for boll weevils but should be used if red spiders appear.

BHC should not be used on cotton where Irish potatoes, turnips, or beets are to be planted the following year, as these crops have

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COTTON BOLL WEEVIL

been known to have an off-flavor following its use. It is not thought to affect peanuts and sweet potatoes.

② Calcium Arsenate can be used where the bollworm is not a serious pest. Use 7 to 10 pounds per acre at 5-day intervals. Best to apply alternately with the BHC-DDT mixture -- arsenate one time, the BHC-DDT mixture the next time. If washed off in 24 hours, repeat applications. A calcium arsenate -- 2 per cent nicotine mixture and a special calcium arsenate -- 2 per cent BHC mixture are also used.

③ Toxaphene -- Use a dust containing 20 per cent technical toxaphene, or a 20 per cent dust plus 40 per cent sulphur. Apply at the rate of 10 to 12 pounds per acre at 5-day intervals. If washed off in 24 hours, repeat.

Some of these insecticides will control one cotton insect pest but not another. For instance, DDT will control the bollworm, but not the boll weevil. BHC will control the boll weevil but not the bollworm. Toxaphene will control both the bollweevil and the bollworm. Sulphur controls the red spider.

Another poison sometimes used is chlordane. Results have been erratic. It is not recommended except in such areas as have had success with its use before. Aldrin 118 is a new insecticide, dust or liquid. It is still being tested but has been released for general use. Apply at the rate of one-fourth pound per acre in the liquid form or 10 pounds per acre as a dust. Another that shows promise is parathion. This should only be applied by operators who are specially equipped for it.

USE OF SPRAYS

Sprays are now generally recommended as being just as effective as dusts in controlling the boll weevil and other cotton insects. They should be used with caution and directions followed to the letter. Farmers who have dusting equipment should continue to use dusts, in view of the cost of buying spray equipment. On the other hand, farmers contemplating buying new equipment for applying cotton poison should give careful study to the use of sprays.

Spray materials recommended by several states are: Toxaphene, using a 40 per cent emulsion, or Toxaphene-DDT in the proportion of 4 pounds technical toxaphene -- 2 pounds technical DDT per gallon of high concentrated emulsion. Dosages vary with growth.

Advantages Of Sprays --

- Chief advantage is that they can be applied under a wide range of weather conditions, even when a moderate wind is blowing.
- Spraying can be done from the tractor when cotton is being cultivated. This cuts out the extra job of poisoning.
- Cost compares favorably with dusting, particularly on large farms.

Cautions --

- Spray when cotton plants are dry.
- Mount spray booms on rear of tractor if possible to safeguard driver.
- Place nozzles 6 to 8 inches from the plants, they should not drag in the plants.
- Use low gallonage, low-pressure spray equipment.
- Don't use any ground sprayer or airplane that has been used to apply 2,4-D since the 2,4-D is very toxic to cotton.
- Lights, traps and dragging sacks, when cultivating, are ineffective -- are not a substitute for spraying.

OTHER COTTON INSECTS

Bollworm -- A major cotton pest. The tiny newborn worms first feed on leaves and then, squares and bolls. As soon as squares with small holes in them are found, apply either BHC-DDT, Toxaphene or 10 per cent DDT dust at the rate of 10 to 12 pounds per acre.

Red Spider -- A small mite, hardly visible to the naked eye, that is found on the underside of cotton leaves. Leaves become blotched with red or yellow spots -- later shed, and sometimes squares and bolls drop also. Controlled by one or more applications of 15 to 20 pounds of dusting sulphur per acre.

Cotton Fleahopper -- An oval-shaped, pale-green winged insect about one-seventh inch long that breeds mostly on goatweed (croton). This pest pierces terminal buds and new squares early in the season, causing them to drop. Controlled by the BHC-DDT dust (3-5 Mixture) with 40 per cent sulphur, or the 20 per cent Toxaphene dust plus 40 per cent sulphur.

Cotton Aphid -- A common plant louse which feeds on leaves and stems, often stunting or killing young plants in cool weather. Controlled by all of the common insecticides except calcium arsenate.

Pink Bollworm -- The most important cotton pest world wide, but it is confined in the United States to a small area by quarantine. These worms are about one-half inch long and a little larger than ordinary pencil lead, never getting as large as the cotton bollworm.

Cotton Leafworm -- A familiar cotton insect, whose presence is indicated by ragged leaves. Controlled by calcium arsenate, 20 per cent toxaphene, 40 per cent sulphur mixture, or BHC-DDT-Sulphur mixture.

COTTON BOLL WEEVIL

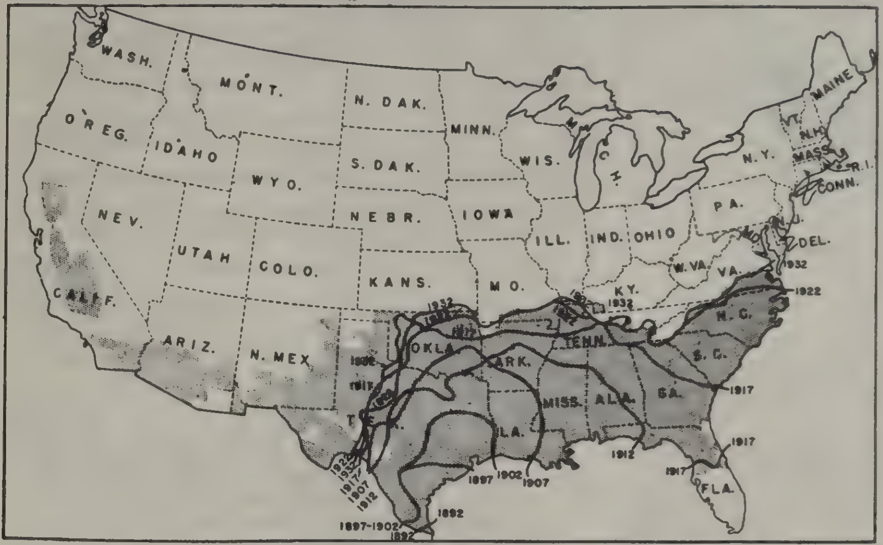
In the United States the boll weevil (*Anthonomus grandis* Boh.) has in some years caused a loss in the cotton crop of more than $200,000,000. The weevil now covers almost the entire main Cotton Belt, where the necessity of combating it has revolutionized the methods of cotton production.

The insect . . , winters as an adult in sheltered places. The weevils that survive the winter emerge from hibernation over a long period, usually from about March 1 to about July 1, and attack squares and young bolls, although preferring the former.

In these they make punctures for feeding or for egg laying. Punctured squares flare open conspicuously , . , and usually fall to the ground in a few days.

Immature weevils die quickly in the shed bolls; in fact, heat and dryness are important natural controls of the boll weevil. A puncture made by a weevil in feeding remains open, but an egg puncture is sealed with a wart-like plug. The egg hatches in about 3 days into a stout white larva, with a head but without legs.

This larva feeds inside a square or boll, becomes full grown in from 7 to 12 days, and passes from 3 to 5 days as a pupa . . . . . from which the beetle emerges.



From about 1892, when the first boll weevils entered the United States from Mexico, until 1922 the weevils advanced from 40 to 160 miles each year. Now they can be found in nine-tenths of the cotton-growing area. This map shows the spread by 5-year periods and the cotton-growing area of the United States.

Boll weevil adults: a, Viewe from above; b, from the side. (Hunter an Coad)

RECOMMENDATIONS FOR CONTROL

INDIRECT CONTROL

When cotton picking is completed before frost, the plants should be immediately destroyed by grazing, cutting, or plowing under. This will deprive the boll weevils of food and force them to feed elsewhere or enter hibernation earlier than normally. In order to gain the full benefits from early destruction of the stalks, this should be done from two to four weeks before frost whenever it is possible.

If fence rows, turn rows, and borders of fields have been allowed to grow up in weeds, grass, and other growth, they should be cleaned up during the fall and winter.

Fall or early winter plowing should be practiced except on blow sands and steep slopes, and all crop residues should be completely turned under.

Farmers should adopt every practice that will hasten the setting and maturing of a crop. . . Each farmer should study the conditions on his farm and plant his cotton as far away from hibernation quarters as is practical and on well-drained land where the plants will grow off fast .. Cotton grows off faster when planted on a well-settled bed.

Early varieties of cotton that set and mature bolls rapidly are essential under boll-weevil conditions. On the fertile bottom lands, where plants make heavy growth, varieties with light foliage are more desirable than those with heavy foliage.

Early planting is essential in weevil-infested areas. It should be done as soon as possible after all danger of frost is over and the ground has warmed up. Sufficient seed to produce a full stand should be planted at this time in order to avoid replanting. The rows should be only wide enough to permit proper cultivation, generally about 3½ feet.

The use of commercial fertilizer on certain types of soils , , , , , . stimulates the plants to mature early as well as increasing the yield.

Cotton should be chopped preferably when there are from four to six leaves on each plant.

Early cultivation is also essential, and the field should be kept free of grass and weeds.

In the weevil-infested portion of this state, cotton production is a race between the setting and maturing of a crop of bolls and the increase in weevil population.

CONTROL BY POISONING

Successful cotton production in the boll-weevil section . . . . . depends almost entirely upon the use of purebred seed and proper cultural practices. If these practices are not followed, no method of poisoning can be expected to be profitable. Poisoning will not produce cotton

The higher the price of cotton, the greater will be the returns from proper poisoning. When the price of lint cotton is less than 10 cents a pound, large gains are necessary for a profit, and when it is less than 8 cents and calcium arsenate is 7 cents or more a pound, the possibility of a profit is so slight that poisoning is not recommended.

The most approved method of direct control is to dust cotton plants with calcium arsenate, beginning as soon as 10 per cent of the squares have been punctured. The poison should be applied, at the rate of from 4 to 6 pounds per acre, when the air is reasonably calm and the plants are moist. Three or more applications at 5-day intervals may be necessary to reduce the infestation to less than 10 per cent. Additional applications may become necessary later on. If a heavy rain falls within one day after dusting, repeat the application as soon as possible.

If overwintered weevils are unusually abundant in the field in early spring, an application of calcium arsenate dust before the plants begin to put on squares is advisable. Use from 2 to 3 pounds per acre.

Or, a molasses mixture consisting of 1 pound calcium arsenate, 1 gallon of water, and 1 gallon of molasses, thoroughly mixed together, may be used. It is applied to the plants at the rate of 1 gallon per acre by means of a homemade rag mop, when the cotton begins to square.

When using dusting machinery employ only that which is specially constructed for cotton dusting.

Airplane dusting has many advantages, especially on large, level, open areas, and usually costs no more than dusting with ground machines.

INEFFECTIVE METHODS OF CONTROL

Such contrivances as weevil-catching machines, the burning of lights, and the use of kerosene or other oils and other strong-smelling materials are absolutely worthless for weevil control. The common practice of dragging sacks and brushes on cultivators damages the cotton plants and does not control the weevil. Such practices as topping of the plants and deep, close cultivation to stop plant growth are never advisable under any conditions.

Oklahoma A. & M. College. Experiment Station Bulletin No. 222

U.S.D.A. Farm Bulletin 1168, Misc. Bulletin 484

If cotton is not setting a normal crop of squares and weather cannot be charged with this condition there is a possibility that the cotton fleahopper is responsible. This insect blasts the tiny squares shortly after they first appear by puncturing them with its sucking mouthparts. Such blasted squares can be easily found by careful search, or the scars where they were developed can be seen on the fruiting branches. Heavily infested plants fail to set a normal crop of fruit . . and may grow tall and whiplike. The fleahopper is a very small insect, not being much over 1/32 inch long when just hatched to 1/8 inch when full grown. These tiny, pale-green insects can be located by carefully examining the terminal buds. The adults are winged and will be flushed from the plants when disturbed.

cotton flea hopper

Plants injured by the cotton fleahopper.

The cotton fleahopper inserts its eggs in great numbers in the pithy stalks of many kinds of weeds, especially the crotons. The insect overwinters in the egg stage in weedy fields. Overgrazed pastures are favorite places where these croton weeds grow. Sometimes these plants grow so abundantly that they are the dominant or most common weed growing these overgrazed pastures. In the spring a generation of fleahoppers is developed on these weeds, sometimes in enormous numbers. When the crotons dry up, or mature, the fleahoppers are forced to migrate to cotton; and fields hitherto but lightly infested are soon invaded by swarms of these insects which at once start attacking the small squares. In southwestern Oklahoma this flight from the crotons to cotton takes place in July and from this month to the end of the growing season cotton fields may remain infested. In eastern Oklahoma, the cotton fields may become infested earlier and the insect may later leave, thereby enabling the plants to set a late crop of bolls. This late crop, however, is subject to attack by the boll weevil.

As the life cycle of the insect, from egg to egg, takes only from two to four weeks, according to the time of year, there is an opportunity for the occurrence of from 6 to 12 generations annually, or an average of 9.

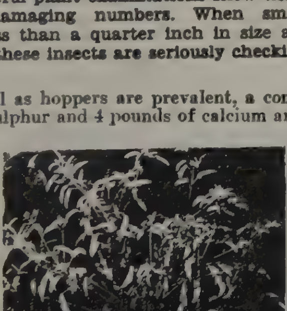
As a general practice, weeds in the vicinity of cotton fields should be destroyed. Croton or goatweed in particular should be eradicated by burning in late fall or in winter. Old cotton stalks should be destroyed, as they also may contain eggs of the hopper.

A method of control recommended at present is dusting with finely ground sulphur at the rate of 10 pounds per acre, when the air is reasonably calm. The presence of many blasted squares on the plants is an indication that dusting should begin. A second application should be made four or five days later, with such additional applications as may be necessary. Often two applications are sufficient.

The sulphur used should be purchased as superfine conditioned dusting sulphur, from 93 to 95 percent or more of which should pass through a 325-mesh screen. Applications should begin when 20 fleahoppers are found per 100 terminals or when fruiting conditions and careful plant examinations show these insects to be present in damaging numbers. When small blackened, dead squares less than a quarter inch in size are numerous, it is a sign that these insects are seriously checking plant fruiting.

Where boll weevils as well as hoppers are prevalent, a combined application of 8 pounds of sulphur and 4 pounds of calcium arsenate per acre should be used.

Sulphur dust is highly inflammable and explosive. It should not be exposed to a flame of any kind and should not be applied to cotton with machinery operated by a gasoline engine, without extreme care.



THE COTTON LOUSE — COTTON APHID

The most abundant aphid on cotton plants is generally the cotton aphid (*Aphis gossypii* Glov.), also known as the cotton louse or melon louse.

Where a louse infestation has developed to the point of injury, control can be accomplished if the following rules are followed carefully:

Nicotine dust should be used.

This dust should be mixed at home and should not be allowed to stand more than 48 hours before use.

Applications should be made only when the air is calm and there is a good prospect that it will remain calm for at least 30 minutes after the application. This is of the utmost importance, as applications during a breeze are wasted. High temperature and dry foliage are favorable to a good kill.

One application, made under proper conditions, will usually be sufficient for commercial control, but additional applications should be made later whenever injury threatens.

Make applications with the same cotton-dusting machinery as used for boll-weevil dusting.

If an application of calcium arsenate is needed for weevil control at the same time as the louse application, the calcium arsenate should be used as a carrier for the nicotine.

In other instances a good grade of hydrated lime or air-slaked lime should be used as a carrier.

To make this nicotine dust, thoroughly mix 100 pounds of the carrier with 6¼ pounds or 5 pints of commercial 40 per cent nicotine-sulphate solution. Apply the dust at a rate slightly heavier than would be used on cotton of the same size for boll-weevil control. This means about 6 to 9 pounds per acre.

Red Spider

The red spider is neither a spider nor an insect, but a small mite that lives on the leaves of a number of plants including cotton. It is red or reddish brown in color and very small but can be seen without the aid of a magnifying glass. These small animals attack the under side of the leaves, sucking the juice from them causing them to turn brown and fall off. Injury from the spider is sometimes mistaken for that of rust, the effect on the leaves being similar. The injury from red spider is usually localized, being confined around the edge of the field, although an entire field is sometimes invaded. The spiders spread over the field slowly by crawling from one plant to another.

As a most important preventive, all weeds and underbrush near a cotton field should be cut and burned in winter or early spring.

As red-spider injury to cotton is usually confined to young plants, early planting is advantageous. In an emergency an infestation that has not advanced far can be checked by pulling up and destroying such plants as show damage. Plowing affected areas to bury the mites and save the rest of the field is advisable in cases of severe local infestation. Several sprays are satisfactory, but they must be applied with extreme care for the poison must reach the under side of the leaf if it is to be effective. Lime-sulphur, kerosene emulsion, and potassium sulphide are used. Dusting cotton with finely ground sulphur (sulphur flour) at the rate of 10 pounds per acre is recommended to control the red spider. As a combined boll-weevil and red-spider application, 8 pounds of sulphur may be mixed with 4 pounds of calcium arsenate for each acre.

THE COTTON LEAFWORM

The cotton leaf worm moth is a strong flier and is world-wide in distribution. The caterpillar feeds on the foliage of cotton and a few related plants. The pest is a subtropical insect and does not survive the winter, even in the southern states, so far as is known. In the spring, it multiplies rapidly and, as the summer advances, the moths fly north to lay eggs on the more northern cotton plantings. Later in the summer and fall, swarms of the moths frequently fly into the northern fruit-growing areas where they may do serious damage to ripe fruit in the orchard and on the city markets. The cotton leaf worm moth is olive tan in color, and its wings expand slightly over one inch. The caterpillar is greenish, marked with lengthwise black stripes and black spots. It crawls with a looping motion, and when disturbed may drop from the plant. The full-fed caterpillar is nearly 1½ inches long and more slender than a common cutworm. The pupa is brown to black and hangs suspended by the tail end from the shredded leaves or is found in folded portions of the damaged leaves.

The pest has several generations each summer and requires about a month to develop from the egg to the moth stage.

Dusting cotton with undiluted calcium arsenate effectively controls the leafworm. Best results are obtained by applications when the caterpillars are small. These insects develop very rapidly and even a short delay in dusting the field may mean severe injury.

Sources: U.S.D.A. Farm Bulletin 1688, Oklahoma A & M Circular 96, Texas A & M Bulletin 377, and Circular 40, U.S.D.A. Leaflet 53, Missouri Bulletin 299 and Circular 268.

COTTON ROOT ROT

Root rot is the most important and the most destructive cotton disease in the United States. It is confined largely to the highly calcareous and alkaline soils of the Southwestern States. The region of greatest damage is in Texas in the heavy, black, waxy soil areas. In that State the disease is known to occur in 196 counties. It also occurs in Oklahoma and Arkansas in a few counties adjacent to Texas, and in some of the irrigated valleys of New Mexico, Arizona, and southern California. The disease also is reported as causing serious damage to alfalfa in Washington County, Utah. The annual losses from root rot run into millions of dollars, and in Texas is about $100,000,000.

The root rot of cotton and many other plants is caused by a fungus (*Phymatotrichum omnivorum*) which lives in the soil and attacks and destroys the roots.

If the roots of freshly wilted plants are examined, a whitish growth is found on the surface, and frequently wartlike wefts occur at the lenticels In the case of plants that have been wilted for some time, the growth of the causal fungus on the roots is buff to yellowish brown and shows a development of coarse brown strands

The fungus may live over from one season to another on the roots of infected plants. Recent experiments have shown also that the root-rot fungus has a sclerotium or hold-over stage which constitutes one of the principal means of carrying over the disease organism in the soil. By means of these sclerotia the fungus is able to remain alive for long periods, at least 3 or 4 years, even in the absence of cotton or other susceptible plants.

The sclerotia or hold-over bodies vary considerably in size and shape, but usually are round to ovoid, flattened, and range from the size of a mustard seed to that of a kernel of wheat These structures are white when newly formed but with age turn yellow to reddish brown. They have been found in the soil beneath infected cotton plants at depths ranging from 2 to 30 inches and frequently occur in colonies or "pockets" in chainlike arrangement especially in the heavy black lands of Texas. Deep-seated infestation in many sections of Texas and Arizona is also common, both sclerotia and coarse strands of the fungus often existing on roots and stumps of trees killed by the disease several years before.

During favorable seasons, especially in warm periods following rainy weather, the root-rot fungus may spread rapidly in the field, the infested areas in cotton or alfalfa fields usually enlarging from a center in ever-widening circles. The spots where all the cotton plants have died in one season may break up or disappear in following seasons and later recur independent of any cultural treatment.

Little is known regarding the means of dissemination of the fungus to new locations. Since, however, sclerotia and strands of the fungus as well as infected plant roots may perpetuate the disease, any practice involving soil transfers from infested localities should be carefully avoided.

Owing to the great diversity and number of plants affected by root rot and the fact that the organism persists in the form of sclerotia and strands, no very satisfactory control measures have as yet been developed. In Texas, where the disease is particularly serious, a 2-year or preferably a 3-year rotation with grain crops, combined with deep tillage immediately after the grain is harvested, has reduced the disease somewhat. Rotation may include corn, wheat, oats, and especially grain sorghums, or other crops that have been found resistant to root rot.

Some of the plants that are commonly attacked by root-rot.

Field and vegetable crops	Fruits	Trees and ornamentals	Non-cultivated plants (weeds)
Alfalfa	Apple	Chinaberry	Cockleburs
Beans	Apricot	Dahlia	Crotons
Beets	Blackberry	Elms	Four-o'clock, wild
Carrot	Fig	Lilac	Ground-cherries
Clovers	Grapes	Locust	Goldenrods
Cotton	Jujube	Maples	Mallows
Cowpea	Peach	Mulberries	Morning-glories
Okra	Pear	Pecan	Pigweeds
Soybean	Persimmon	Poplars	Ragweeds
Sweet clovers	Plum	Privet	Sunflowers
Sweet potato	Quince	Rose	Thistles
Tomato	Raspberry	Spruces	Vetches, wild

There are over 900 kinds of plants now known to be susceptible

U.S.D.A. Farm Bulletin 1745
Texas A & M, Bulletin 494 & 423

SUMMARY OF CONTROL MEASURES

Disease	Control measures
Root rot	Rotate with grain crops and subsoil land after grains are harvested. Apply organic manures in irrigated districts. Disinfect isolated centers of infection with ammonia or formaldehyde solution, or ammonium compounds. Construct barriers to prevent spread.
Fusarium wilt	Use wilt-resistant varieties. Fertilize to produce more vigorous plants. Add humus to soil. Rotate to reduce root knot.
Verticillium wilt	Rotate with alfalfa or grain crops.
Root knot	Rotate with immune crops. In irrigated valleys of the Southwestern States maintain clean fallow with deep summer tillage.
Anthracnose	Avoid susceptible varieties. Select seed from disease-free plants or use seed from areas least affected by disease. Rotate crops.
Bacterial blight	Use disease-free seed. Treat seed with organic-mercury dust disinfectants.
Rust	Add humus to the soil. Use potash fertilizers. Drain wet land.
Crazy top	Rotate with alfalfa.

Although many soil disinfectants have been tried in attempts to eradicate root rot, the results in general have not been satisfactory. However, for eradicating small centers of infection in cotton fields or in areas where one desires to make limited plantings of fruit trees, shade trees, or ornamental plants, dilute solutions (2 and 4 percent, respectively) of either formaldehyde or ammonia water[3] may afford protection. Ammonium phosphate or ammonium sulphate plus hydrated lime (3 parts of lime to 5 parts of ammonium sulphate) may also be used in treating small areas of infection, if the work is thoroughly done.

The formaldehyde solution is made by placing 2½ gallons of formaldehyde (40-percent U. S. P.) in a barrel or other wooden container and diluting with water to make 50 gallons. Approximately 4-percent ammonia water is prepared by adding 8 gallons of strong ammonia water (28 percent) to 42 gallons of water. The soil in the diseased area should first be thoroughly worked or spaded to a depth of 12 to 18 inches and then saturated with the ammonia solution at least 6 to 8 months before planting.

It should be remembered, however, that the effective use of soil disinfectants is restricted to areas where the fungus can be reached by such treatment. In many of the infested districts of Arizona, southern California, and southern Texas the fungus often extends to depths of 4 or 5 feet, and in such cases the use of disinfectants for eradication purposes becomes impracticable.

Various kinds of barriers to limit the spread of root rot in the field have been developed. Among these are trench barriers containing mixtures of soil and such chemicals as ammonia and sulphur; mixtures of soil and waste motor oil, and open trench barriers of varying depths. One with ammonia may be prepared by digging a trench 10 to 12 inches wide and 1 foot deep, about 4 to 6 feet in front of the zone of infected plants, and saturating this with 6-percent ammonia water[4] at the rate of 1 gallon per lienar foot. The trench is then filled with soil from a root-rot-free area.

A similar barrier may be made with waste motor oil mixed in the proportion of 1 part of oil to 10 parts of soil by weight. After the trench has been dug to the stated depth the desired barrier width is obtained by using board forms in the trench and filling the space with the oil-soil mixture. The latter is packed down thoroughly and the forms removed after the space on the opposite side has been filled with soil.

The Texas station also has found that 4 to 12 rows of grain sorghum are valuable barriers to prevent the spread of root rot.

836.2

ROOT KNOT

Root-knot of cotton and other crops is caused by tiny eelworms, or nematodes. They bore into the roots from the soil and irritate them, causing the plant to form galls.

Root knot affects the cotton crop more or less in practically every State in the Cotton Belt. Like wilt, it is most severe on sandy soils of poor water-holding capacity.

Cotton root-knot can be controlled by using crop rotations in which root-knot immune crops are planted on diseased fields and susceptible crops are avoided. On badly diseased fields a rotation of two or three years is advised, and even then not more than one susceptible crop should be grown before planting again with resistant crops.

On less-diseased fields a one-year rotation, including a root-knot resistant summer legume and two crops of winter grain may be sufficient.

Crops largely or entirely immune to root knot

Barley
Beggarweed, Florida
Chufa
Corn
Cowpea (Brabham, Iron, Victor)
Crotalaria spectabilis
Grasses (nearly all, including Bermuda grass and crabgrass)
Kafir
Millets (nearly all)
Milo
Oats, winter
Peanut
Rye
Sorghum
Soybean (Laredo variety only)
Velvetbean
Wheat

Crops not very severely affected by root knot

Alfalfa
Asparagus
Bean, snap
Cabbage
Collards
Cotton
Pea, garden
Radish
Soybean (Otootan)
Spinach
Strawberry
Sugarcane
Sweetclover
Sweetpotato
Vetch, common

Crops most severely affected by root knot

Bean, lima
Beet
Bur-clover
Carrot
Celery
Cowpea (all varieties except Iron, Brabham, and Victor)
Cucumber
Eggplant
Fig
Lettuce
Muskmelon
Okra
Peach
Potato
Salsify
Soybean (all varieties except Laredo and Otootan)
Squash
Tobacco
Tomato
Watermelon
Papaya

Weeds susceptible to root knot

Balloonvine
Clover, Mexican
Fennel, sweet
Maypop, or passionflower
Mayweed
Purslane

BACTERIAL BLIGHT

Bacterial blight is variously called bacterial boll rot, angular leaf spot, vein blight, and black arm, depending upon the part of the plant attacked. It occurs generally throughout the South, and also in the southwestern cotton areas, especially in Arizona.

Bacterial blight is caused by a bacterium or germ (*Bacterium* (*Phytomonas*) *malvacearum*) which enters the leaves, stems, and bolls through the breathing pores and kills the adjoining cells, producing spots on the leaves, dead areas on the branches, and a decay of the bolls. Rainy weather accompanied by wind is an important factor in spreading the bacteria.

The bacteria causing the disease live over the winter chiefly on the seed and possibly on diseased portions of cotton stalks and bolls left in the field from the previous crop. There is very little evidence, however, that the bacteria survive in the soil. They are carried within the seed coat to a certain extent.

The most effective method of controlling blight is to use disease-free seed. The seed may be practically freed of the blight bacteria if treated with special dust disinfectants or if delinted with sulphuric acid or with hydrochloric acid gas.

Bacterial boll-rot

vein blight

"black-arm"

angular leaf spot

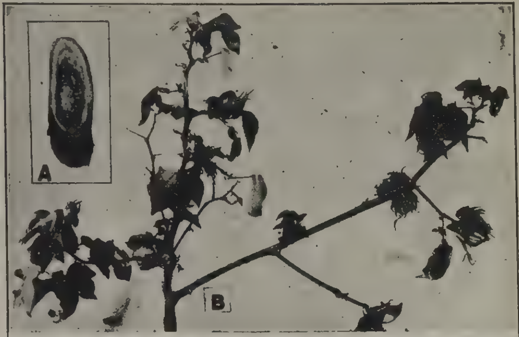
Nearly all workers agree that acid delinting, followed by grading and seed dusting, gives the highest quality planting seed available.

The chemicals in universal use for cotton seed dusting are two organic mercury compounds sold under the trade names of "New Improved Ceresan" and "2% Ceresan" respectively. The dust is used at the rate of 1½ oz. ("New Improved Ceresan") or 3 oz. ("2% Ceresan") per bushel of cotton seed at a cost for chemical used of 4 to 6 cents per bushel treated Commercial acid-delinted seed is available

WILT

FUSARIUM WILT

Cotton wilt may be suspected when plants wilt and die without any apparent reason. If the stem of a freshly wilted plant is cut across near the ground and found to be black or brown inside (fig. 1, *A*), this is strong evidence of the disease. Plants affected by wilt early in the season are considerably stunted as compared with healthy plants. Frequently the main stem of such a plant remains short, while one or more of the lower branches grow normally.



1.—Wilted cotton stalk cut across to show the blackening of the inside (*A*); cotton plant showing the main stalk stunted by wilt and one lower branch normally developed, only one side being infected (*B*).

The presence of the cotton wilt fungus in the soil will not interfere with the successful cultivation of other crops in infested soil. The wilt fungus is largely restricted to acid soils that are deficient in potash, so that it rarely if ever occurs in the same field with root rot. The fungus is spread from one part of the field to another by microscopic, wind-borne, seed-like spores. It is rarely introduced into new locations with infested cotton seed.

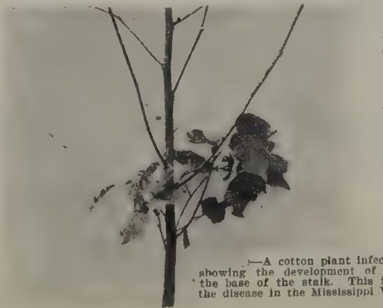
The planting of wilt-resistant varieties of cotton and liberal fertilization to produce more vigorous plants are the most effective methods of controlling wilt. The amount and type of fertilizer to use depends on local soil conditions.

In areas where root knot is prevalent, especially in light sandy soils, wilt is also more prevalent and destructive. In these localities it is necessary to plant root-knot-resistant crops for 1 or more years before attempting to control the wilt even by growing wilt-resistant varieties of cotton.

VERTICILLIUM WILT

Verticillium wilt of cotton, similar in many respects to fusarium wilt, has been known in the United States only since 1927. It is known to occur in Arkansas, California, Mississippi, Oklahoma, Tennessee, and Virginia. The disease is quite prevalent in the Delta counties of Mississippi, in Tennessee and Arkansas, and in the San Joaquin Valley of California. In the Mississippi Delta the infection varies from a trace to as much as 40 percent in some fields.

The leaf symptoms mentioned above, such as mottling and discoloration, although characteristic of this disease, also occur in cotton plants infected with fusarium wilt and hence cannot be used as a distinguishing character for either disease. Discoloration of the vascular tissues of the stems and roots also occurs in both wilts. Although difficult to distinguish from fusarium wilt except by laboratory culture methods, some differences in the two diseases may be recognized. Plants infected with fusarium wilt are characterized by dwarfing and are frequently killed during the season, whereas those infected with verticillium wilt are not dwarfed, seldom are killed, and often produce yields comparing favorably with normal plants. The development of new slender branches at the base of the plant (fig. 11) also frequently occurs in cotton plants infected with *Verticillium*. The almost complete shedding of leaves during August and September is especially characteristic of cotton plants infected with verticillium wilt (fig. 12), the same symptoms occurring much earlier and to a somewhat less extent in plants infected with fusarium wilt.



No definite control measures for verticillium wilt are known. Rotation with alfalfa or grain crops is suggested as a possible means of reducing infection in cotton fields. Breeding resistant varieties of cotton may solve the problem.

—A cotton plant infected with verticillium wilt, showing the development of new slender branches at the base of the stalk. This is a distinctive feature of the disease in the Mississippi Valley.

U.S.D.A. Farm Bulletins 1187, 1345, & 1745.
Oklahoma A & M Circular #96.

EUROPEAN CORN BORER

More than 30 years ago, a few innocent-looking little brown worms took a boat ride -- either from Hungary or Italy -- across the Atlantic Ocean to the United States in a shipment of broomcorn. During 1949, their descendants cost United States farmers $349,635,000 in damage to field and sweet corn crops, not to mention money spent in an effort to keep the loss from being much greater. The not-so-innocent little brown worms were European Corn Borers, and there is no question but that this pest is here to stay.

HOW TO FIGHT THE CORN BORER

Here are the four main lines of attack, which, with variations, promise near-normal crops despite borers. This is a community problem. The lack of cooperation of only one of your neighbors could ruin your control program. Plan to meet together to make sure you all agree on the control measures to be used.

① Plow under all corn stalks before May 15. Get all the stalks underground -- they're crawling with borers. This action will cut down first brood borers.

The depth of plowing for corn borer control is not important, provided all infested material is covered completely to such a depth that it will not again be brought to the soil surface by later cultivation or weathering. In order to insure proper coverage, and to reduce the possibility of the plowed-under material being again dragged to the surface, plowing to a depth of at least 6 inches should be adopted if soil conditions permit.

At least a 14 inch bottom plow should be used to get good coverage. Jointers, either the moldboard or disk type, are essential. Wires or metal shields can be used to hold the trash down while it is being turned under.

Corn-picker attachments for killing borers by shredding or chopping the stalks have been used experimentally. Various rotary stalk shredders or cutters are now on the market. A wide range of effectiveness has been reported so that the real value of stalk cutters in corn borer control has not been determined. But any measure that kills an appreciable percentage of the borer population is at least a supplementary measure because "dead borers don't have babies".

② Avoid early planting, or very late planting. Planting at the right time will cut down second-brood damage. On fertile soil in most of the Corn Belt, plant about mid-May. The safest dates are between May 15 and May 25. Corn planted at this time will escape much of the early-season infestation of corn borers, and will still have time to mature a good crop in normal seasons.

It is a big risk to plant early, and also to plant late -- after June 1. Both early planting and very late planting on fertile soils help build up borer numbers.

On soils of low fertility there is no need to hold up planting in order to get away from borer damage. Borers are not usually attracted to corn on these soils in large enough numbers to cause serious damage.

③ Plant the best adapted hybrid for your community, with emphasis on the ones that have shown they will stand borer attack. The most satisfactory hybrids are those now commonly sold by the seed producers, the lines most susceptible to borer attack and those least tolerant of it having been discarded.

④ Be ready to spray your fields at the proper time, either with ground machines or by air. Be sure your sprayer is overhauled and ready for use. It may take as many as three sprayings a season to get effective control of the two-brooded borers.

WHEN TO SPRAY

The better the timing, the better the control. Walk through your fields every day from June 1 on. Learn to recognize and count egg masses.

→ If you find 50 or more egg masses per 100 plants, and the corn is at least 35 inches tall (to the tips of the leaves) spray or dust within the next seven days.

→ Continue to count egg masses after the first treatment. It you're still finding 50 egg masses per 100 plants a week later, spray or dust again.

→ If you think your field corn needs only one treatment, spray or dust 10 to 12 days after the first egg masses appear, for best control.

→ Check your corn again in August. If you find 100 egg masses per 100 plants, it will pay to spray or dust. Yields won't be increased much, but you'll have less ear-dropping and fewer broken stalks.

DOANE AGRICULTURAL DIGEST ® APR., 1950

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EUROPEAN CORN BORER

WHAT TO SPRAY OR DUST

DDT and ryania are the only materials recommended. Both give good control, but DDT is cheaper, easier to get, and can be applied in low-volume, low-pressure sprays. CAUTION: DDT is not recommended for spraying corn to be used for silage. Ryania is recommended as a high-volume spray or dust.

Parathion has shown considerable promise, but is extremely poisonous to humans.

Remember that the use of insecticides is a good supplementary measure. But, it is not a substitute for good farming practices. These two measures must be included in any efficient and economical program of control.

HOW TO SPRAY OR DUST

Spraying gives better results than dusting. The best methods for using insecticides, in order of effectiveness, according to Corn Belt entomologists are:

1. Ground spraying with high gallonage per acre (30-50 gallons) and high pressures (150-300 pounds).

2. Ground spraying with low gallonage per acre (5-15 gallons) and low pressures (35-100 pounds).

3. Aircraft spraying. Some of the heavier applications (from 2 to 5 gallons) look promising.

4. Aircraft and ground dusting.

If you plan to have a custom operator do your spraying, be sure he's available on a 24 hour call. Custom spraying will probably cost about $3 per acre. If a farmer has to spray three times a year to control the borer, the cost will be about $10 per acre.

Use 1-1/2 pounds of actual DDT per acre if you spray. If you dust, use 2 pounds of actual DDT per acre. Concentrated sprays in oil are not recommended.

TRAP CROPS

In any given area the earliest planted fields of corn, particularly sweet corn, usually suffer the heaviest corn borer infestation. The use of a small area of very early planted sweet corn in fields intended for a main crop of field corn or late-planted sweet corn, attracts the corn borer moth and acts as a trap crop. Such trap crops must be destroyed or used for fodder early in the season. Actual attempts to apply the trap-crop method of control, under field conditions, have failed to show reliable results from year to year. Trap crops cannot be depended on, but they attract moths that would otherwise lay their eggs on the main corn crop.

INEFFECTIVE MEASURES

Trap Lights -- The use of trap lights as a method of control has seldom been successful with any insect pest. Repeated observations with many types, kinds and colors of lights showed that the number of corn borer moths attracted to such lights comprised less than one per cent of the total number of corn borer moths in the vicinity.

Attractive Bait--While such a trap has proved useful for technical purposes, it is not recommended as an effective means of protecting corn from the corn borer.

LIFE OF THE BORER

During its lifetime, the borer goes through four stages of development; egg, worm, cocoon and moth. There are two strains of corn borers -- one which produces only one generation a year; the other produces two. The second is the more important. Usually about half of all the early-season worms change into moths that lay eggs for the second generation.

Below is the history of the borer:

NOVEMBER-APRIL -- Full-grown worms over-winter in cornstalks in the field, in the cobs of stored corn and in large-stalked weeds.

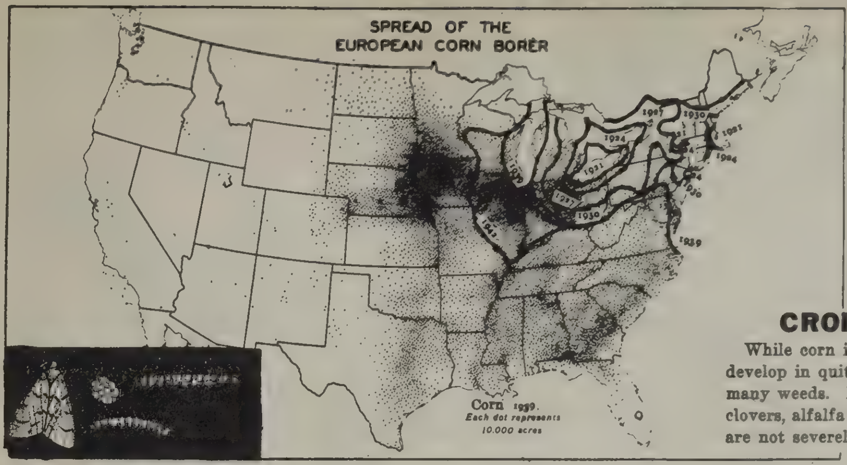
MAY -- Many over-wintering worms change to the cocoon (pupal) stage. Early moths begin to hatch.

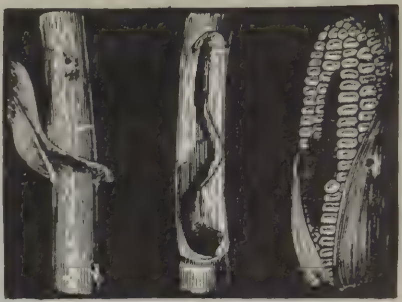
JUNE -- The cocoon (pupal) stage is finished and early moths come out of the cocoons and lay eggs. Late June and early July is usually the time of greatest egg laying. This time, however, depends on the weather and may come as early as mid-June or as late as mid-July. Moths choose the tallest or most mature corn on which to lay their eggs. During June, borers will be found in all stages -- eggs, worms, cocoons and moths.

JULY -- Moths finish laying eggs; early season moths die. Worms from the eggs laid by the early season moths are becoming full grown. During the last of the month, full grown worms of the strain that produces two or more generations a year go into the cocoon stage. Single-generation worms do not go into the cocoon stage but remain worms the rest of the season and during the winter.

AUGUST-OCTOBER -- Moths of the two-generation strain are plentiful during August and continue in fewer and fewer numbers through September and into October. Worms that they produce feed in the stalks the rest of the season, most of them becoming full grown before winter. If moth flight is late and winter begins early, some borers may not become full-grown and will be killed during the winter.

EUROPEAN CORN BORER





CROPS WHICH IT MAY ATTACK

While corn is the pest's favorite crop, it can and does feed and develop in quite a number of other garden and field crops, and in many weeds. Fortunately, the legumes such as soybeans, cowpeas, clovers, alfalfa and lespedeza, as well as wheat, oats, barley and rye, are not severely attacked.

LIFE CYCLE

The life cycle of the corn borer in Illinois is proving different from what it is in Ohio. Seventy to 80 percent of the borers are producing two generations a year, instead of only one. This will probably continue to be the case, according to all present indications. In fact in southern Illinois the insect is almost certain to produce three generations a year when it becomes well established there.

The two-generation strain is more serious because

- **—two generations of worms develop each year, instead of one**
- **—the number of second generation moths commonly exceeds that of the first by about 3 to 1.**
- **—the first generation attacks growing corn in a comparatively early stage, and the second comes in time to attack the ears.**

With two generations a year the life cycle of the borer will be approximately as described here:

May. The borers, which have overwintered in the stems of plants, change to the pupal (brown resting) stage.

June. First-generation moths emerge from the pupal stage and lay their eggs, the heaviest part of the egg-laying period coming during the latter part of June. These moths choose the tallest, most rapidly growing corn on which to lay their eggs. Borers will be found in all stages this month.

July. First-generation borers are becoming full grown and changing to the pupal stage. There are fewer moths in flight than in June altho some eggs are being laid. Second-generation borers are beginning to hatch. The borer will be found in all its stages this month also.

August-October. Heavy flight of second-generation moths comes in August, especially the latter part, and continues into September and even into October. By mid-September the oldest of the second-generation borers are full-grown and nearly all will complete their growth during October. The borers go into the winter in the worm stage and in that stage only. They bore into the stems of plants, particularly cornstalks and large weeds, and thus protected they pass thru the winter. When warm weather returns in the spring they are ready to develop into the pupal (brown resting) stage and start the life cycle over again.

USE RESISTANT HYBRIDS

That some strains are only lightly damaged has been shown by tests carried on for fifteen years in Ohio. The differences appear as variations in (1) the attractiveness of the corn plant to the moth of the borer, (2) the ability of the borers to establish themselves in the plant and survive there, and (3) the ability of the plant, even tho infested, to produce a good yield of marketable corn.

Plant seed of this kind if you can get it, choosing the most resistant hybrid that is suited to your locality.

DELAY PLANTING

On highly productive or fertilized soils corn planted as late as May 12 to 20 in central Illinois will escape much of the first-generation infestation of corn borers and still have time to mature a normal crop in most seasons.

The reason delayed planting is of so much importance in corn-borer control is that much of the later planted corn will not be high enough to attract the moths until after the peak of the moth flight has passed. The moths prefer the tallest corn on which to deposit their eggs.

Late planting will not prevent infestation by second-generation borers, most of which hatch in August.

Illinois Circular 555, 521, 539
Missouri Circular 200
Wisconsin Special Circular

PRACTICE CLEAN FARMING

Since the pest spends the winter as a caterpillar largely in the corn stalks and stubble, the complete destruction or utilization of these before the moths emerge the following summer will reduce the pest to a minimum each year. By cutting corn low, and either placing it in the silo or later shredding it, few of the overwintering caterpillars will escape. Where the corn is shucked and the fodder left standing, or where it is cut and shocked and later shucked and the fodder fed to livestock, it is important that all the stalks and stubbles be completely disposed of either by raking and burning or by plowing under completely.

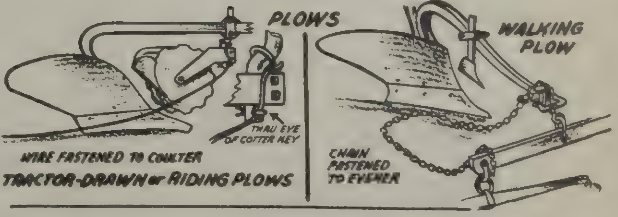
The most economical and effective way to destroy borers is to plow under all stalks and other plant material in infested fields. The material must be buried deep enough so that none will be brought up in later operations. Even tho some borers will work their way up to the surface, few will survive where there is no plant material into which they can crawl for shelter. In order to bury *all* stalks, plowing must be very well done.

If plowing under stalks and other clean-up methods are to be commercially worth while, they must be applied to all infested fields over a large area, for the moths will fly from one field to another.

***Burning fields is of little value.* It sacrifices soil fertility and often kills only a few borers.**

TO GET GOOD TRASH COVERAGE

—work down standing stalks and stubble by use of a light log chain looped back of the tractor draw-bar ahead of the plow to drag down the stalks and make possible good coverage.



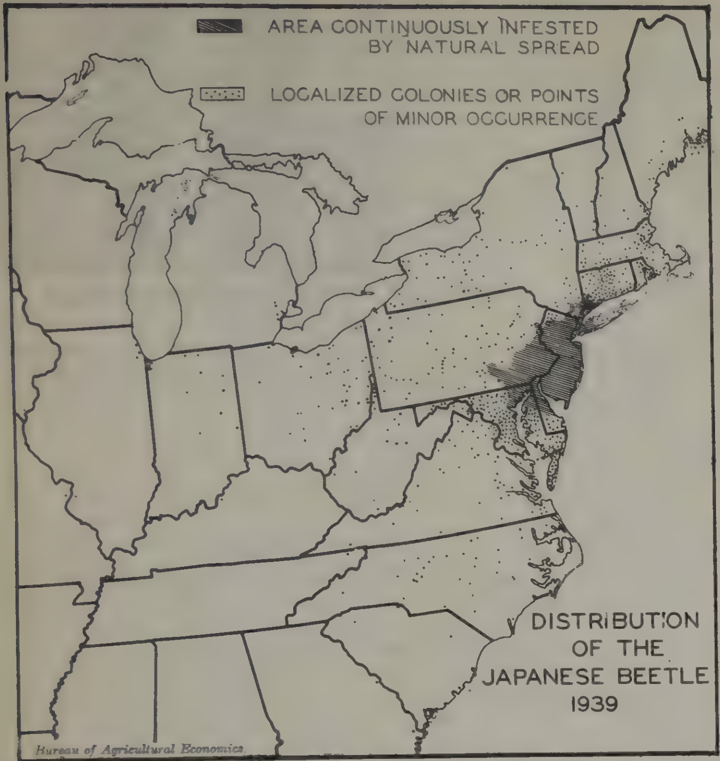
Under extremely trashy conditions, it is necessary to fasten one or two No. 8 or 9 wires to the coulter shank of each plow. Wires should be 12 to 15 feet long. Short pieces of chain can be substituted for wire.

INSECTICIDES PROTECT SWEET CORN

Insecticides are the only means of protecting early and late sweet corn from the corn borer, for there is little information yet about resistant sweet-corn varieties and delayed planting is not practicable since sweet corn must mature thruout the marketing season. Cost of treatment is fairly high but will be profitable to market gardeners in most Illinois localities where the borers threaten to destroy as much as 25 percent of the marketable crop.

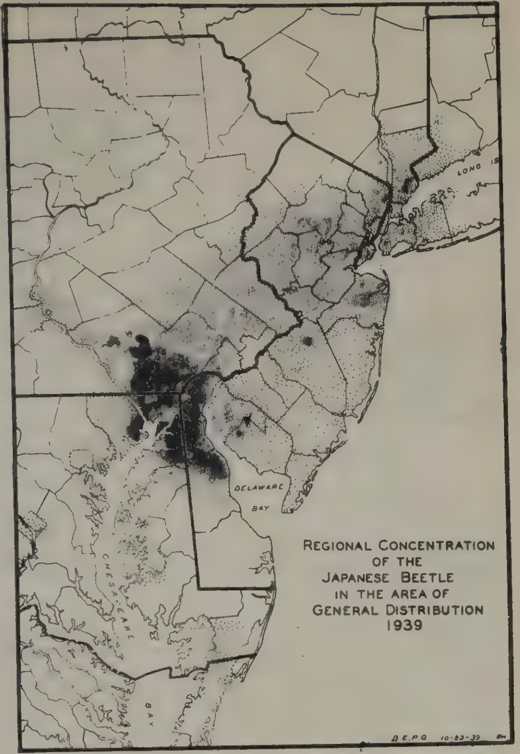
Dusting or spraying with nicotine or rotenone has given the best results. Either material must be applied four or five times—first when the borers begin to hatch and later at five-day intervals.

JAPANESE BEETLE


AREA CONTINUOUSLY INFESTED BY NATURAL SPREAD
LOCALIZED COLONIES OR POINTS OF MINOR OCCURRENCE

DISTRIBUTION OF THE JAPANESE BEETLE 1939

Bureau of Agricultural Economics



REGIONAL CONCENTRATION OF THE JAPANESE BEETLE IN THE AREA OF GENERAL DISTRIBUTION 1939

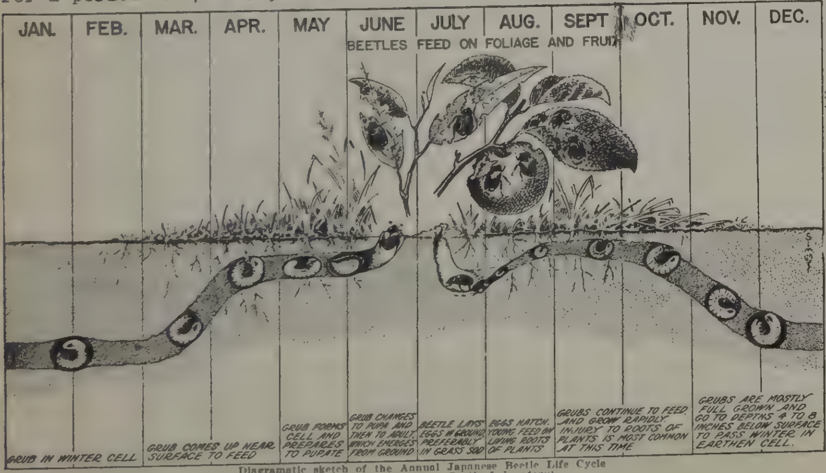
B.E.P.Q. 10-23-39

The Japanese beetle is one of the most destructive insects which has been introduced into the United States. The adult is known to feed on 260 different plants. Some of the most attractive plant hosts are apple, cherry, and grape; and such shade trees as elm, horsechestnut, and linden. The evergreen, common grains (except corn silks), most truck and field crops, and pears are rarely or never fed upon.

The eggs are laid in the ground and the larvae which develop feed on living plant roots in the soil where they do considerable damage to growing plants, especially sod, in heavily infested areas.

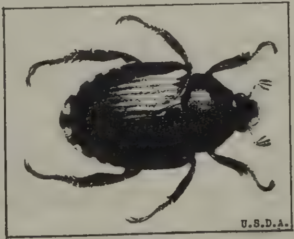
Few of our native insect parasites attact the Japanese beetle. However, two parasites known as the Japanese Tiphia and Korean Tiphia have been introduced. Where these have become established they are known to produce from 7 to 38 per cent parasitization. The Japanese beetle is of little economic importance in its natural habitat, Japan, because it is being held in check by parasites. Many birds also attact this pest.

The most effective chemical treatment consists of treating the soil with 10 to 15 pounds of lead arsenate per 1000 square feet. The poison may either be sprayed on or mixed with sand and other coarse material and spread dry. In either case it must be washed into the soil so that larvae in working through the soil take in enough of the poison to kill them. The treatment does not harm most grasses but it is not recommended for pastures because of the danger to domestic animals. Birds usually escape injury because they are not attracted to the lawn once the grubs and worms have been killed. Under normal conditions the arsenate treatment is effective for a period of 4 to 5 years.


JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT
OCT.
NOV.
DEC.
BEETLES FEED ON FOLIAGE AND FRUIT
GRUB IN WINTER CELL
GRUB COMES UP NEAR SURFACE TO FEED
GRUB FORMS CELL AND PREPARES TO PUPATE
GRUB CHANGES TO PUPA AND THEN TO ADULT, WHICH EMERGES FROM GROUND
BEETLE LAYS EGGS IN GROUND, PREFERABLY IN GRASS SOD
EGGS HATCH. YOUNG FEED ON LIVING ROOTS OF PLANTS
GRUBS CONTINUE TO FEED AND GROW RAPIDLY. INJURY TO ROOTS OF PLANTS IS MOST COMMON AT THIS TIME
GRUBS ARE MOSTLY FULL GROWN AND GO TO DEPTHS 4 TO 8 INCHES BELOW SURFACE TO PASS WINTER IN EARTHEN CELL.

Diagramatic sketch of the Annual Japanese Beetle Life Cycle
(Courtesy Federal Japanese Beetle Laboratory)

Bureau of Entomology and Plant Quai



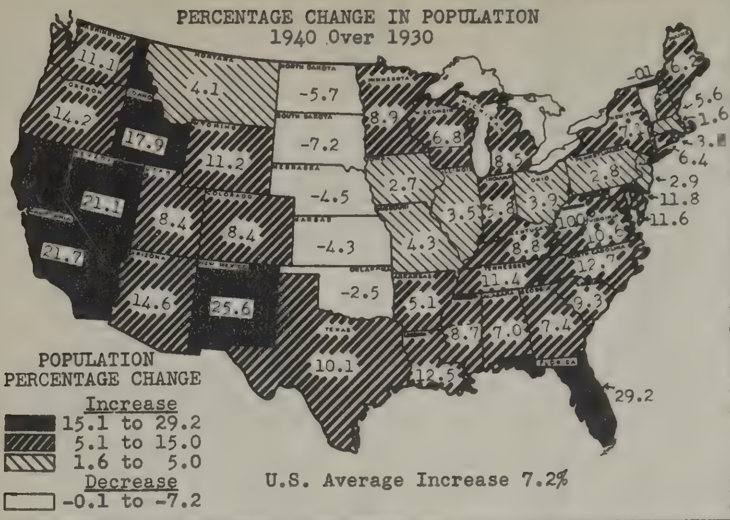
U.S.D.A.

HOW TO RECOGNIZE THE JAPANESE BEETLE

"The adult, or beetle is nearly an inch long, one-fourth inch wide, broadly oval, and shinning metallic green. The hard wing covers are a coppery brown and extend from the thorax almost, but not quite, to the extreme hind end of the body. There are 2 small tufts of white hairs just behind the wing covers and 5 patches along each side, which enable one to distinguish the Japanese beetle from other beetles that resemble it." U.S.D.A.

POPULATION - 1940

PERCENTAGE CHANGE IN POPULATION
1940 Over 1930



The total population of the United States in 1940 was 131,669,275 - an increase of 8,894,229 over that of 1930. This increase in the last decade was 7.2 per cent as compared with the 16.1 per cent increase during the 10 years, 1920-1930. The 1930-1940 rate of increase was less than one-half that shown in any previous decade since the first census in 1790.

In the past 10 years the Pacific States showed the greatest per cent of increase (18.8%), and the West North Central States the smallest per cent increase (1.7%). The only states having decreases in population were North and South Dakota, Nebraska, Kansas, Oklahoma, and Vermont. Florida showed the greatest increase in population during the 10-year period, 1930-1940, with a net increase of 29.2 per cent. Three other states showed an increase of over 20 per cent.

In the tables below and on the back of the page are the figures showing 1940 population of urban places of 5,000 inhabitants or more.

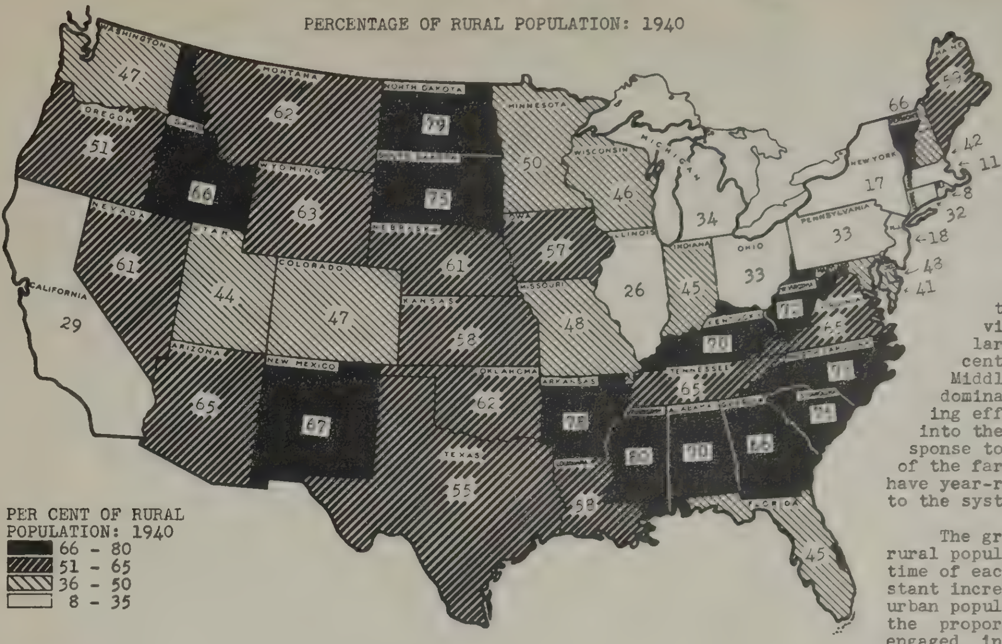
Place	1940
ALABAMA:	2,832,961
Alexander City	6,640
Andalusia	6,886
Anniston	25,523
Bessemer	22,826
Birmingham	267,583
Cullman	5,074
Decatur	16,604
Dothan	17,194
Eufaula	6,269
Fairfield	11,703
Florence	15,043
Gadsden	36,975
Greenville	5,075
Homewood	7,397
Huntsville	13,050
Jasper	6,847
Lanett	6,141
Mobile	78,720
Montgomery	78,084
Opelika	8,487
Phenix City	15,351
Prichard	6,084
Selma	19,834
Sheffield	7,933
Sylacauga	6,269
Talladega	9,298
Tarrant City	6,833
Troy	7,055
Tuscaloosa	27,493
Tuscumbia	5,515
ARIZONA:	499,261
Bisbee	5,853
Douglas	8,623
Flagstaff	5,080
Globe	6,141
Mesa	7,224
Nogales	5,135
Phoenix	65,414
Prescott	6,018
Tucson	36,818
Yuma	5,325
ARKANSAS:	1,949,387
Arkadelphia	5,078
Batesville	5,267
Blytheville	10,652
Camden	8,975
Conway	5,782
El Dorado	15,858
Fayetteville	8,212
Forrest City	5,699
Fort Smith	36,584
Helena	8,546
Hope	7,475
Hot Springs	21,370
Jonesboro	11,729
Little Rock	88,039
Malvern	5,290
North Little Rock	21,137
Paragould	7,079
Pine Bluff	21,290
Russellville	5,927
Stuttgart	5,628
Texarkana	11,821
Van Buren	5,422
CALIFORNIA:	6,907,387
Alameda	36,256
Albany	11,493
Alhambra	38,935
Anaheim	11,031
Antioch	5,106
Arcadia	9,122
Azusa	5,209
Bakersfield	29,252
Bell	11,264
Belvedere township	37,192
Berkeley	85,547
Beverly Hills	26,823
Brawley	11,718
Burbank	34,337
Burlingame	15,940
Calexico	5,415
Chico	9,287
Chula Vista	5,138
Coalinga	5,026
Colton	9,686
Compton	16,198
Corona	8,764
Coronado	6,932
Culver City	8,976
Daly City	9,625
El Centro	10,017
El Cerrito	6,137
Eureka	17,055
Fresno	60,685
Fullerton	10,442
Gardena	5,909
Glendale	82,582
Grass Valley	5,701
Hanford	8,234
Hawthorne	8,263
Hayward	6,736
Hermosa Beach	7,197
Huntington Park	28,648
Inglewood	30,114
Lodi	11,079
Long Beach	164,271
Los Angeles	1,504,277
Lynwood	10,982
Madera	6,457
Manhattan Beach	6,398
Martinez	7,381
Marysville	6,646
Maywood	10,731
Merced	10,135
CALIFORNIA - Con.:	
Modesto	16,379
Monrovia	12,807
Montebello	8,016
Monterey	10,084
Monterey Park	8,531
Napa	7,740
National City	10,344
Oakland	302,163
Ontario	14,197
Orange	7,901
Oxnard	8,519
Pacific Grove	6,249
Palo Alto	16,774
Pasadena	81,864
Petaluma	8,034
Piedmont	9,866
Pittsburg	9,520
Pomona	23,539
Porterville	6,270
Redding	8,109
Redlands	14,324
Redondo Beach	13,092
Redwood City	12,453
Richmond	23,642
Riverside	34,696
Roseville	6,653
Sacramento	105,958
Salinas	11,586
San Anselmo	5,790
San Bernardino	43,646
San Bruno	6,519
San Buenaventura (Ventura)	13,264
San Diego	203,341
San Fernando	9,094
San Francisco	634,536
San Gabriel	11,867
San Jose	68,457
San Leandro	14,601
San Luis Obispo	8,881
San Marino	8,175
San Mateo	19,403
San Rafael	8,573
Santa Ana	31,921
Santa Barbara	34,958
Santa Clara	6,650
Santa Cruz	16,896
Santa Maria	8,522
Santa Monica	53,500
Santa Paula	8,986
Santa Rosa	12,605
South Gate	26,945
South Pasadena	14,356
South San Francisco	6,629
Stockton	54,714
Torrance	9,950
Tulare	8,259
Upland	6,316
Vallejo	20,072
Visalia	8,904
Watsonville	8,937
Whittier	16,115
Woodland	6,637
COLORADO:	1,123,296
Alamosa	5,613
Boulder	12,958
Canon City	6,690
Colorado Springs	36,789
Denver	322,412
Durango	5,887
Englewood	9,680
Fort Collins	12,251
Grand Junction	12,479
Greeley	15,995
La Junta	7,040
Longmont	7,406
Loveland	6,145
Pueblo	52,162
Sterling	7,411
Trinidad	13,223
Walsenburg	5,855
CONNECTICUT:	1,709,242
Ansonia	19,210
Bridgeport	147,121
Bristol	30,167
Danbury	22,339
Derby	10,287
East Hartford town	18,615
Hartford	166,267
Meriden	39,494
Middletown	26,495
Naugatuck	15,388
New Britain	68,685
New Haven	160,605
New London	30,456
Norwalk	39,849
Norwich	23,652
Putnam	7,775
Rockville	7,572
Shelton	10,971
Southington	5,088
Stamford	47,938
Stratford town	22,580
Torrington	26,988
Wallingford	11,425
Waterbury	99,314
West Hartford town	33,776
West Haven town	30,021
Willimantic	12,101
Winsted	7,674
DELAWARE:	266,505
Dover	5,517
Wilmington	112,504
DISTRICT OF COLUMBIA:	663,091
Washington	663,091
FLORIDA:	1,897,414
Bartow	6,158
Bradenton	7,444
Clearwater	10,136
Coral Gables	8,294
Daytona Beach	22,584
De Land	7,041
Fort Lauderdale	17,996
Fort Myers	10,604
Fort Pierce	8,040
Gainesville	13,757
Hollywood	6,239
Jacksonville	173,065
Key West	12,927
Lake City	5,836
Lakeland	22,068
Lake Wales	5,024
Lake Worth	7,408
Marianna	5,079
Miami	172,172
Miami Beach	28,012
Ocala	8,986
Orlando	36,736
Palatka	7,140
Panama City	11,610
Pensacola	37,449
Plant City	7,491
River Junction	7,110
St. Augustine	12,090
St. Petersburg	60,812
Sanford	10,217
Sarasota	11,141
Tallahassee	16,240
Tampa	108,391
West Palm Beach	33,693
Winter Haven	8,199
GEORGIA:	3,123,723
Albany	19,055
Americus	9,281
Athens	20,650
Atlanta	302,288
Augusta	65,919
Bainbridge	6,352
Brunswick	15,035
Carrollton	6,214
Cartersville	6,141
Cedartown	9,025
College Park	8,213
Columbus	53,280
Cordele	7,929
Dalton	10,448
Decatur	16,561
District 1511, Center Hill	12,155
Douglas	5,175
Dublin	7,814
East Point	12,403
Elberton	6,188
Fitzgerald	7,388
Gainesville	10,243
Griffin	13,222
Hapeville	5,059
La Grange	21,983
Macon	57,865
Marietta	8,667
Milledgeville	6,778
Moultrie	10,147
Newnan	7,182
Rome	26,282
Savannah	95,996
Statesboro	5,028
Thomaston	6,396
Thomasville	12,683
Tifton	5,228
Toccoa	5,494
Valdosta	15,595
Waycross	16,763
IDAHO:	524,873
Boise City	26,130
Burley	5,329
Caldwell	7,272
Coeur d'Alene	10,049
Idaho Falls	15,024
Lewiston	10,548
Moscow	6,014
Nampa	12,149
Pocatello	18,133
Twin Falls	11,851
ILLINOIS:	7,897,241
Alton	31,255
Arlington Heights	5,668
Aurora	47,170
Batavia	5,101
Beardstown	6,505
Belleville	28,405
Bellwood	5,220
Belvidere	8,094
Benton	7,372
Berwyn	48,451
Bloomington	32,868
Blue Island	16,638
Brookfield	10,817
Cairo	14,407
Calumet City	13,241
Canton	11,577
Carbondale	8,550
Centralia	16,343
Champaign	23,302
Charleston	8,197
Chester	5,110
Chicago	3,396,808
Chicago Heights	22,461
Cicero	64,712
Clinton	6,331
Collinsville	9,767
ILLINOIS - Con.	
Danville	36,919
Decatur	59,305
De Kalb	9,146
Des Plaines	9,518
Dixon	10,671
Downers Grove	9,526
Du Quoin	7,515
East Moline	12,359
East Peoria	6,806
East St. Louis	75,609
Edwardsville	8,008
Effingham	6,180
Elgin	38,333
Elmhurst	15,458
Elmwood Park	13,689
Evanston	65,389
Flora	5,474
Forest Park	14,840
Freeport	22,366
Galesburg	28,876
Glencoe	6,825
Glen Ellyn	8,055
Granite City	22,974
Harrisburg	11,453
Harvey	17,878
Herrin	9,352
Highland Park	14,476
Hinsdale	7,336
Hoopeston	5,331
Jacksonville	19,844
Johnston City	5,418
Joliet	42,365
Kankakee	22,241
Kewanee	16,901
La Grange	10,479
Lake Forest	6,885
La Salle	12,812
Lawrenceville	6,213
Lincoln	12,752
Litchfield	7,048
Lombard	7,075
Macomb	8,764
Madison	7,782
Marion	9,251
Mattoon	15,827
Maywood	26,648
Melrose Park	10,933
Metropolis	6,287
Moline	34,608
Monmouth	9,096
Morris	6,145
Mount Carmel	6,987
Mount Vernon	14,724
Murphysboro	8,976
Naperville	5,272
Niles Center	7,172
Normal	6,983
North Chicago	8,465
Oak Park	66,015
Olney	7,831
Ottawa	16,005
Pana	5,966
Paris	9,261
Park Ridge	12,063
Pekin	19,407
Peoria	105,087
Peru	8,983
Pontiac	9,585
Princeton	5,224
Quincy	40,469
River Forest	9,487
Riverside	7,935
Rockford	84,637
Rock Island	42,775
St. Charles	5,870
Salem	7,319
Springfield	75,503
Spring Valley	5,010
Sterling	11,363
Streator	14,930
Summit	7,043
Taylorville	8,313
Urbana	14,064
Vandalia	5,288
Venice	5,454
Villa Park	7,236
Waukegan	34,241
West Frankfort	12,383
Wheaton	7,389
Wilmette	17,226
Winnetka	12,430
Wood River	8,197
Woodstock	6,123
Zion	6,555
INDIANA:	3,427,796
Anderson	41,572
Auburn	5,415
Bedford	12,514
Bicknell	5,110
Bloomington	20,870
Bluffton	5,417
Brazil	8,126
Clinton	7,092
Columbus	11,738
Connersville	12,898
Crawfordsville	11,089
Decatur	5,861
East Chicago	54,637
Elkhart	33,434
Elwood	10,913
Evansville	97,062
Fort Wayne	118,410
Frankfort	13,706
Franklin	6,264
Gary	111,719
Goshen	11,375
Greensburg	6,065
INDIANA - Con.:	
Hammond	70,184
Hartford City	6,946
Hobart	7,166
Huntington	13,903
Indianapolis	386,972
Jasper	5,041
Jeffersonville	11,493
Kendallville	5,431
Kokomo	33,795
Lafayette	28,798
La Porte	16,180
Lebanon	6,529
Linton	6,263
Logansport	20,177
Madison	6,923
Marion	26,767
Martinsville	5,009
Michigan City	26,476
Mishawaka	28,298
Mount Vernon	5,638
Muncie	49,720
New Albany	25,414
New Castle	16,620
Noblesville	5,575
Peru	12,432
Plymouth	5,713
Portland	6,362
Princeton	7,786
Richmond	35,147
Rushville	5,960
Seymour	8,620
Shelbyville	10,791
South Bend	101,268
Sullivan	5,077
Tell City	5,395
Terre Haute	62,693
Tipton	5,101
Valparaiso	8,736
Vincennes	18,228
Wabash	9,653
Warsaw	6,378
Washington	9,312
West Lafayette	6,270
Whiting	10,307
Winchester	5,302
IOWA:	2,538,268
Albia	5,157
Ames	12,555
Atlantic	5,802
Boone	12,373
Burlington	25,832
Carroll	5,389
Cedar Falls	9,349
Cedar Rapids	62,120
Centerville	8,413
Chariton	5,754
Charles City	8,681
Cherokee	7,469
Clinton	26,270
Council Bluffs	41,439
Creston	8,033
Davenport	66,039
Decorah	5,303
Des Moines	159,819
Dubuque	43,892
Estherville	5,651
Fairfield	6,773
Fort Dodge	22,904
Fort Madison	14,063
Grinnell	5,210
Iowa City	17,182
Keokuk	15,076
Knoxville	6,936
Le Mars	5,353
Marshalltown	19,240
Mason City	27,080
Muscatine	18,286
Newton	10,462
Oelwein	7,801
Oskaloosa	11,024
Ottumwa	31,570
Perry	5,977
Red Oak	5,763
Shenandoah	6,846
Sioux City	82,364
Spencer	6,599
Storm Lake	5,274
Washington	5,227
Waterloo	51,743
Webster City	6,738
KANSAS:	1,801,028
Abilene	5,671
Arkansas City	12,752
Atchison	12,648
Chanute	10,142
Coffeyville	17,355
Concordia	6,255
Dodge City	8,487
El Dorado	10,045
Emporia	13,188
Fort Scott	10,557
Garden City	6,285
Great Bend	9,044
Hays	6,385
Hutchinson	30,013
Independence	11,565
Iola	7,244
Junction City	8,507
Kansas City	121,458
Lawrence	14,390
Leavenworth	19,220
McPherson	7,194
Manhattan	11,659
Newton	11,048
Ottawa	10,193
Parsons	14,294
Pittsburg	17,571
KANSAS - Con..	
Pratt	6,591
Salina	21,073
Topeka	67,833
Wellington	7,246
Wichita	114,966
Winfield	9,506
KENTUCKY:	2,845,627
Ashland	29,537
Bellevue	8,741
Bowling Green	14,585
Corbin	7,893
Covington	62,018
Danville	6,734
Dayton	8,379
Fort Thomas	11,034
Frankfort	11,492
Glasgow	5,815
Harlan	5,122
Hazard	7,397
Henderson	13,160
Hopkinsville	11,724
Jenkins	9,428
Lexington	49,304
Louisville	319,077
Ludlow	6,186
Madisonville	8,209
Mayfield	8,619
Maysville	6,572
Middlesborough	11,777
Newport	30,631
Owensboro	30,245
Paducah	33,765
Paris	6,697
Princeton	5,389
Richmond	7,336
Somerset	6,154
Winchester	8,594
LOUISIANA:	2,363,880
Abbeville	6,672
Alexandria	27,066
Bastrop	6,626
Baton Rouge	34,719
Bogalusa	14,604
Bossier City	5,786
Crowley	9,523
Eunice	5,242
Gretna	10,879
Hammond	8,033
Houma	9,052
Jackson	5,384
Jennings	7,343
Lafayette	19,210
Lake Charles	21,207
Minden	6,677
Monroe	28,309
Morgan City	6,969
Natchitoches	6,812
New Iberia	13,747
New Orleans	494,537
Opelousas	8,980
Plaquemine	5,049
Ruston	7,107
Shreveport	98,167
Tallulah	5,712
Thibodaux	5,851
West Monroe	8,560
MAINE:	847,226
Auburn	19,817
Augusta	19,360
Bangor	29,822
Bath	10,235
Belfast	5,540
Biddeford	19,790
Brewer	6,510
Brunswick	7,003
Calais	5,161
Gardiner	6,044
Lewiston	38,598
Old Town	7,688
Presque Isle	5,456
Portland	73,643
Rockland	8,899
Rumford Falls	8,447
Saco	8,631
South Portland	15,781
Waterville	16,688
Westbrook	11,087
MARYLAND:	1,821,244
Annapolis	13,069
Baltimore	859,100
Cambridge	10,102
Cumberland	39,483
Frederick	15,802
Frostburg	7,659
Hagerstown	32,491
Hyattsville	6,575
Salisbury	13,313
Takoma Park	8,938
District 12 (Baltimore Co.)	18,436
District 13 (Baltimore Co.)	13,366
MASSACHUSETTS:	4,316,721
Abington town	5,708
Adams town	12,608
Amesbury town	10,862
Amherst town	6,410
Andover town	11,122
Arlington town	40,013
Athol town	11,180
Attleboro	22,071
Auburn town	[illegible]

POPULATION – 1940

Place	1940
MASSACHUSETTS - Con.:	
Barnstable town	8,333
Belmont town	26,867
Beverly	25,537
Boston	770,816
Braintree town	16,378
Bridgewater town	8,902
Brockton	62,343
Brookline town	49,786
Cambridge	110,879
Canton town	6,381
Chelsea	41,259
Chicopee	41,664
Clinton town	12,440
Concord town	7,972
Danvers town	14,179
Dartmouth town	9,011
Dedham town	15,508
Dracut town	7,339
Easthampton town	10,316
Everett	46,784
Fairhaven town	10,938
Fall River	115,428
Fitchburg	41,824
Framingham town	23,214
Franklin town	7,303
Gardner	20,206
Gloucester	24,046
Great Barrington town	6,824
Greenfield town	15,672
Haverhill	46,752
Hingham town	8,003
Holyoke	53,750
Hudson town	8,042
Ipswich town	6,348
Lawrence	84,323
Leominster	22,226
Lexington town	13,187
Lowell	101,389
Longmeadow town	5,790
Ludlow town	8,181
Lynn	98,123
Malden	58,010
Mansfield town	6,530
Marblehead town	10,856
Marlborough	15,154
Maynard town	6,812
Medford	63,083
Melrose	[illegible]
Methuen town	21,880
Middleborough town	9,032
Milford town	15,388
Millbury town	6,983
Milton town	18,708
Montague town	7,982
Natick town	13,851
Needham town	12,445
New Bedford	110,341
Newburyport	13,916
Newton	69,873
North Adams	[illegible]
Northampton	24,794
North Andover town	7,524
North Attleborough town	10,359
Northbridge town	10,242
Norwood town	15,383
Orange town	5,611
Palmer town	9,149
Peabody	21,711
Pittsfield	49,684
Plymouth town	13,100
Quincy	75,810
Randolph town	7,634
Reading town	10,866
Revere	34,405
Rockland town	8,087
Salem	41,213
Saugus town	14,825
Somerset town	5,873
Somerville	102,177
Southbridge town	16,825
South Hadley town	6,856
Spencer town	6,641
Springfield	149,554
Stoneham town	10,765
Stoughton town	8,632
Swampscott town	10,761
Taunton	37,395
Uxbridge town	6,417
Wakefield town	16,223
Walpole	7,443
Waltham	40,020
Ware	7,557
Watertown town	35,427
Webster town	13,186
Wellesley town	15,127
Westfield	18,793
West Springfield town	17,135
Weymouth town	23,868
Whitman town	7,759
Winchendon town	6,575
Winchester town	15,081
Winthrop town	16,768
Woburn	19,751
Worcester	193,694
MICHIGAN:	5,256,106
Adrian	14,230
Albion	8,345
Alma	7,202
Alpena	12,808
Ann Arbor	29,815
Battle Creek	43,453
Bay City	47,956
Benton Harbor	16,668
Berkley	6,406
Birmingham	11,196
Cadillac	9,855
Charlotte	5,544
Cheboygan	5,673
Coldwater	7,343
Dearborn	63,584
Detroit	1,623,452
Dowagiac	5,007
East Detroit	8,584
East Lansing	5,839
Ecorse	13,209
Escanaba	14,830
Ferndale	22,523
Flint	151,543
Grand Haven	8,799
Grand Rapids	164,292
Greenville	5,321
Grosse Pointe	6,179
Grosse Pointe Farms	7,217
Grosse Pointe Park	12,646
Hamtramck	49,839
Hancock	5,554
Hastings	5,175
Highland Park	50,810
Hillsdale	6,381
Holland	14,616
Inkster	7,044
Ionia	6,392
Iron Mountain	11,080
Ironwood	13,369
Ishpeming	9,491
Jackson	49,656
Kalamazoo	54,097
Kingsford	5,771
Lansing	78,753
Lapeer	5,365
Lincoln Park	15,236
Ludington	8,701
Manistee	8,694
Manistique	5,399
Marquette	15,928
Marshall	5,253
Menominee	10,230
Midland	10,329
Monroe	18,478
Mount Clemens	14,389
Mount Pleasant	8,413
Muskegon	47,697
Muskegon Heights	16,047
Negaunee	6,813
Niles	11,328
Owosso	14,424
Petoskey	6,019
Plymouth	5,360
Pontiac	66,626
Port Huron	32,759
River Rouge	17,008
Roseville	9,023
Royal Oak	25,087
Saginaw	82,794
St. Clair Shores	10,405
St. Joseph	8,963
Sault Ste. Marie	15,847
Sturgis	7,214
Three Rivers	6,710
Traverse City	14,455
Trenton	5,284
Wyandotte	30,618
Ypsilanti	12,121
MINNESOTA	2,792,300
Albert Lea	12,200
Alexandria	5,051
Anoka	6,426
Austin	18,307
Bemidji	9,427
Brainerd	12,071
Chisholm	7,487
Cloquet	7,304
Columbia Heights	6,053
Crookston	7,161
Detroit Lakes	5,015
Duluth	101,065
Edina	5,855
Ely	5,970
Eveleth	6,887
Faribault	14,527
Fairmont	8,193
Fergus Falls	10,848
Hastings	5,662
Hibbing	16,385
International Falls	5,626
Little Falls	6,047
MINNESOTA - Con.:	
Mankato	15,654
Minneapolis	492,370
Montevideo	5,220
Moorhead	9,491
New Ulm	8,743
Owatonna	8,694
Red Wing	9,962
Richfield	6,750
Robbinsdale	6,018
Rochester	26,312
St. Cloud	24,173
St. Louis Park	7,737
St. Paul	287,736
St. Peter	5,870
South St. Paul	11,844
Stillwater	7,013
Thief River Falls	6,019
Virginia	12,264
West St. Paul	5,733
Willmar	7,623
Winona	22,490
Worthington	5,918
MISSISSIPPI:	2,183,796
Biloxi	17,475
Brookhaven	6,232
Canton	6,011
Clarksdale	12,168
Columbia	6,064
Columbus	13,645
Corinth	7,818
Greenville	20,892
Greenwood	14,767
Grenada	5,831
Gulfport	15,195
Hattiesburg	21,026
Jackson	62,107
Laurel	20,598
McComb	9,898
Meridian	35,481
Natchez	15,296
Pascagoula	5,900
Picayune	5,129
Tupelo	8,212
Vicksburg	24,460
West Point	5,627
Yazoo City	7,258
MISSOURI:	3,784,664
Boonville	6,089
Brookfield	6,174
Cape Girardeau	19,426
Carthage	10,585
Caruthersville	8,612
Charleston	5,182
Chillicothe	8,012
Clayton	13,069
Clinton	6,041
Columbia	18,399
De Soto	5,121
Ferguson	5,724
Flat River	5,401
Fulton	8,297
Hannibal	20,865
Independence	16,066
Jefferson City	24,268
Joplin	37,144
Kansas City	399,178
Kennett	6,315
Kirksville	10,080
Kirkwood	12,132
Lebanon	5,025
Lexington	5,341
Maplewood	12,875
Marshall	8,533
Maryville	5,700
Mexico	9,053
Moberly	12,920
Neosho	5,318
Nevada	8,181
Poplar Bluff	11,163
Richmond Heights	12,802
Rolla	5,141
St. Charles	10,803
St. Joseph	75,711
St. Louis	816,048
Sedalia	20,428
Sikeston	7,944
Springfield	61,238
Trenton	7,046
University City	33,023
Warrensburg	5,868
Washington	6,756
Webb City	7,033
Webster Groves	18,394
MONTANA:	559,456
Anaconda	11,004
Billings	23,261
Bozeman	8,665
Butte	37,081
Great Falls	29,928
Havre	6,427
Helena	15,056
Kalispell	8,245
Lewistown	5,874
Livingston	6,642
Miles City	7,313
Missoula	18,449
NEBRASKA:	1,315,834
Alliance	6,253
Beatrice	10,883
Columbus	7,632
Fairbury	6,304
Falls City	6,146
Fremont	11,862
Grand Island	19,130
Hastings	15,145
Kearney	9,643
Lincoln	81,984
McCook	6,212
Nebraska City	7,339
Norfolk	10,490
North Platte	12,429
Omaha	223,844
Scottsbluff	12,057
York	5,383
NEVADA:	110,247
Las Vegas	8,422
Reno	21,317
Sparks	5,318
NEW HAMPSHIRE:	491,524
Berlin	19,084
Claremont town	12,144
Concord	27,171
Derry town	5,400
Dover	14,990
Exeter town	5,398
Franklin	6,749
Keene	13,832
Laconia	13,484
Lebanon town	7,590
Manchester	77,685
Nashua	32,927
Newport town	5,304
Portsmouth	14,821
Rochester	12,012
Somersworth	6,136
NEW JERSEY:	4,160,165
Asbury Park	14,617
Atlantic City	64,094
Audubon	8,906
Bayonne	79,198
Belleville	28,167
Bergenfield	10,275
Bloomfield	41,623
Bogota	7,346
Boonton	6,739
Bound Brook	7,616
Bridgeton	15,992
Burlington	10,905
Camden	117,536
Carlstadt	5,644
Carteret	11,976
Cliffside Park	16,892
Clifton	48,827
Collingswood	12,685
Cranford township	12,860
Dover	10,491
Dumont	7,556
Dunellen	5,360
East Orange	68,945
East Rutherford	7,268
Elizabeth	109,912
Englewood	18,966
Fair Lawn	9,017
Fairview	8,770
Fort Lee	9,468
Freehold	6,952
Garfield	28,044
Glen Ridge	7,331
Glen Rock	5,177
Gloucester City	13,692
Guttenberg	6,200
Hackensack	26,279
Haddonfield	9,742
Haddon Heights	5,558
Haledon	6,303
Hammonton	7,668
Harrison	14,171
Hasbrouck Heights	6,716
Hawthorne	12,610
Highland Park	9,002
Hillside township	18,556
Hoboken	50,115
Irvington	55,328
Jersey City	301,173
Kearny	39,467
Keyport	5,147
Leonia	5,763
Linden	24,115
Lodi	11,552
Long Branch	17,408
Lyndhurst township	17,454
Madison	7,944
Manville	6,065
Maplewood township	23,139
Metuchen	6,557
NEW JERSEY - Con.:	
Millburn township	11,652
Millville	14,806
Montclair	39,807
Morristown	15,270
Neptune township	10,207
Newark	429,760
New Brunswick	33,180
Newton	5,533
North Arlington	9,904
North Bergen township	39,714
North Plainfield	10,586
Nutley	21,954
Orange	35,717
Palisades Park	8,141
Palmyra	5,178
Passaic	61,394
Paterson	139,656
Paulsboro	7,011
Pennsauken township	17,745
Penns Grove	6,488
Perth Amboy	41,242
Phillipsburg	18,314
Pitman	5,507
Plainfield	37,469
Pleasantville	11,050
Princeton	7,719
Prospect Park	5,714
Rahway	17,498
Red Bank	10,974
Ridgefield	5,271
Ridgefield Park	11,277
Ridgewood	14,948
Roselle	13,597
Roselle Park	9,661
Rutherford	15,466
Salem	8,618
Sayreville	8,186
Secaucus	9,754
Somerville	8,720
South Amboy	7,802
South Orange	13,742
South Plainfield	8,379
South River	10,714
Summit	16,165
Teaneck township	25,275
Tenafly	7,413
Totowa	6,130
Trenton	124,697
Union City	56,173
Union township	24,730
Ventnor City	7,905
Verona	8,957
Vineland	7,914
Wallington	8,981
Weehawken township	14,363
Westfield	18,458
West New York	39,439
West Orange	25,662
Westwood	5,388
Wildwood	5,150
Woodbridge township	27,191
Woodbury	8,306
Wood-Ridge	5,739
NEW MEXICO:	531,818
Albuquerque	35,449
Carlsbad	7,116
Clovis	10,065
Gallup	7,041
Hobbs	10,619
Las Cruces	8,385
Las Vegas city	5,941
Las Vegas town	6,421
Portales	5,104
Raton	7,607
Roswell	13,482
Santa Fe	20,325
Silver City	5,044
Tucumcari	6,194
NEW YORK	13,479,142
Albany	130,577
Amityville	6,056
Amsterdam	33,329
Auburn	35,753
Batavia	17,267
Beacon	12,572
Binghamton	78,309
Bronxville	6,888
Buffalo	575,901
Canandaigua	8,321
Catskill	5,429
Cedarhurst	5,463
Cohoes	21,955
Corning	15,212
Cortland	15,881
Depew	6,084
Dobbs Ferry	5,883
Dunkirk	17,713
East Aurora	5,253
East Rochester	6,691
East Rockaway	5,610
Elmira	45,106
Endicott	17,702
Floral Park	12,950
Fredonia	5,738
Freeport	20,410
Fulton	13,362
Garden City	11,223
Geneva	15,555
Glen Cove	12,415
Glens Falls	18,836
Gloversville	23,329
Great Neck	6,167
Hamburg	5,467
Hastings-on-Hudson	7,057
Haverstraw	5,909
Hempstead	20,856
Herkimer	9,617
Hornell	15,649
Hudson	11,517
Hudson Falls	6,654
Ilion	8,927
Irondequoit town	23,376
Ithaca	19,730
Jamestown	42,638
Johnson City	18,039
Johnstown	10,666
Kenmore	18,612
Kingston	28,589
Lackawanna	24,058
Lancaster	7,236
Larchmont	5,970
Little Falls	10,163
Lockport	24,379
Long Beach	9,036
Lynbrook	14,557
Malone	8,743
Malverne	5,153
Mamaroneck	13,034
Massena	11,328
Mechanicville	7,449
Medina	5,871
Middletown	21,908
Mineola	10,064
Mount Kisco	5,941
Mount Vernon	67,362
Newark	9,646
Newburgh	31,883
New Rochelle	58,408
New York City	7,454,995
Bronx Borough	1,394,711
Brooklyn Borough	2,698,285
Manhattan Borough	1,889,924
Queens Borough	1,297,634
Richmond Borough	174,441
Niagara Falls	78,029
North Pelham	5,052
North Tarrytown	8,804
North Tonawanda	20,254
Norwich	8,694
Nyack	5,206
Ogdensburg	16,346
Olean	21,506
Oneida	10,291
Oneonta	11,731
Ossining	15,996
Oswego	22,062
Owego	5,065
Patchogue	7,181
Peekskill	17,311
Pelham Manor	5,302
Penn Yan	5,308
Plattsburg	16,351
Port Chester	23,073
Port Jervis	9,749
Poughkeepsie	40,478
Rensselaer	10,768
Rochester	324,975
Rockville Centre	18,613
Rome	34,214
Rye	9,865
Salamanca	9,011
Saranac Lake	7,138
Saratoga Springs	13,705
Scarsdale	12,966
Schenectady	87,549
Scotia	7,960
Seneca Falls	6,452
Solvay	8,201
Syracuse	205,967
Tarrytown	6,874
Tonawanda	13,008
Troy	70,304
Tuckahoe	6,563
Tupper Lake	5,451
Utica	100,518
Valley Stream	16,679
Watertown	33,385
Watervliet	16,114
Waverly	5,450
Wellsville	5,942
White Plains	40,327
Williston Park	5,750
Yonkers	142,598
NORTH CAROLINA:	3,571,623
Asheboro	6,981
Asheville	51,310
NORTH CAROLINA - Con.:	
Burlington	12,198
Canton	5,037
Charlotte	100,899
Concord	15,572
Dunn	5,256
Durham	60,195
Elizabeth City	11,564
Fayetteville	17,428
Forest City	5,039
Gastonia	21,313
Goldsboro	17,274
Greensboro	59,319
Greenville	12,674
Hamlet	5,111
Henderson	7,647
Hendersonville	5,381
Hickory	13,487
High Point	38,495
Kings Mountain	6,547
Kinston	15,388
Laurinburg	5,685
Lenoir	7,598
Lexington	10,550
Lumberton	5,803
Monroe	6,475
Mooresville	6,682
Morganton	7,670
Mount Airy	6,286
New Bern	11,815
Newton	5,407
Raleigh	46,897
Reidsville	10,387
Roanoke Rapids	8,545
Rocky Mount	25,568
Salisbury	19,037
Shelby	14,037
Statesville	11,440
Tarboro	7,148
Thomasville	11,041
Washington	8,569
Wilmington	33,407
Wilson	19,234
Winston-Salem	79,815
NORTH DAKOTA:	641,935
Bismarck	15,496
Devils Lake	6,204
Dickinson	5,839
Fargo	32,580
Grand Forks	20,228
Jamestown	8,790
Mandan	5,685
Minot	16,577
Valley City	5,917
Williston	5,790
OHIO:	6,907,612
Akron	244,791
Alliance	22,405
Ashland	12,453
Ashtabula	21,405
Athens	7,696
Barberton	24,028
Barnesville	5,002
Bedford	7,390
Bellaire	13,799
Bellefontaine	9,808
Bellevue	6,127
Berea	6,025
Bexley	8,705
Bowling Green	7,190
Bryan	5,404
Bucyrus	9,727
Cambridge	15,044
Campbell	13,785
Canton	108,401
Cheviot	9,043
Chillicothe	20,129
Cincinnati	455,610
Circleville	7,982
Cleveland	878,336
Cleveland Heights	54,992
Columbus	306,087
Conneaut	9,355
Coshocton	11,509
Cuyahoga Falls	20,546
Dayton	210,718
Defiance	9,744
Delaware	8,944
Delphos	5,746
Dover	9,691
East Cleveland	39,495
East Liverpool	23,555
East Palestine	5,123
Elyria	25,120
Euclid	17,866
Findlay	20,228
Fostoria	13,453
Fremont	14,710
Galion	8,685
Gallipolis	7,832
Garfield Heights	16,989
Girard	9,805
Grandview Heights	8,960
Greenville	7,745
Hamilton	50,592
Ironton	15,851
Jackson	6,295
Kent	8,581
Kenton	7,593
Lakewood	69,160
Lancaster	21,940
Lima	44,711
Lockland	5,801
Logan	6,177
Lorain	44,125
Mansfield	37,154
Maple Heights	6,728
Marietta	14,543
Marion	30,817
Martins Ferry	14,729
Massillon	26,644
Miamisburg	5,544
Middletown	31,220
Mingo Junction	5,192
Mount Vernon	10,122
Nelsonville	5,368
Newark	31,487
New Boston	8,024
New Philadelphia	12,328
Niles	16,273
North College Hill	5,231
Norwalk	8,211
Norwood	34,010
Oakwood	7,652
Painesville	12,235
Parma	16,365
Piqua	16,049
Portsmouth	40,466
Ravenna	8,538
Reading	6,079
Rocky River	8,291
St. Bernard	7,387
St. Marys	5,532
Salem	12,301
Sandusky	24,874
Shaker Heights	23,393
Shelby	6,643
Sidney	9,790
South Euclid	6,146
Springfield	70,662
Steubenville	37,651
Struthers	11,739
Tiffin	16,102
Toledo	282,349
Toronto	7,426
Troy	9,697
Uhrichsville	6,435
University Heights	5,981
Upper Arlington	5,370
Urbana	8,335
Van Wert	9,227
Wadsworth	6,495
Wapakoneta	5,225
Warren	42,837
Washington Court House	9,402
Wellston	5,537
Wellsville	7,672
Wilmington	5,971
Wooster	11,543
Xenia	10,633
Youngstown	167,720
Zanesville	37,500
OKLAHOMA:	2,336,434
Ada	15,143
Altus	8,593
Alva	5,055
Anadarko	5,579
Ardmore	16,886
Bartlesville	16,267
Blackwell	8,537
Bristow	6,050
Chickasha	14,111
Clinton	6,736
Cushing	7,703
Duncan	9,207
Durant	10,027
Elk City	5,021
El Reno	10,078
Enid	28,081
Frederick	5,109
Guthrie	10,018
Henryetta	6,905
Hobart	5,177
Holdenville	6,632
Hugo	5,909
Lawton	18,055
McAlester	12,401
Miami	8,345
Muskogee	32,332
Norman	11,429
Oklahoma City	204,424
Okmulgee	16,051
Pauls Valley	5,104
Pawhuska	5,443
Perry	5,045
Picher	5,848
Ponca City	16,794
Sapulpa	12,249
Sand Springs	6,137
OKLAHOMA - Con.:	
Seminole	11,547
Shawnee	22,053
Stillwater	10,097
Tulsa	142,157
Vinita	5,685
Wewoka	10,315
Woodward	5,406
OREGON:	1,089,684
Albany	5,654
Astoria	10,389
Baker	9,342
Bend	10,021
Corvallis	8,392
Eugene	20,838
Grants Pass	6,028
Klamath Falls	16,497
La Grande	7,747
Marshfield	5,259
Medford	11,281
Oregon City	6,124
Pendleton	8,847
Portland	305,394
Salem	30,908
The Dalles	6,266
PENNSYLVANIA:	9,900,180
Abington township	20,857
Aliquippa	27,023
Allentown	96,904
Altoona	80,214
Ambridge	18,968
Archbald	8,296
Arnold	10,898
Ashland	7,045
Ashley	6,371
Avalon	6,155
Bangor	5,687
Beaver	5,641
Beaver Falls	17,098
Bellefonte	5,304
Bellevue	10,488
Berwick	13,181
Bethlehem	58,490
Blairsville	5,008
Blakely	8,106
Bloomsburg	9,799
Brackenridge	6,400
Braddock	18,326
Bradford	17,691
Brentwood	7,552
Bridgeport	5,904
Bristol	11,895
Brownsville	8,015
Butler	24,477
Canonsburg	12,599
Carbondale	19,371
Carlisle	13,984
Carnegie	12,663
Centerville	6,317
Chambersburg	14,852
Charleroi	10,784
Cheltenham township	19,082
Chester	59,285
Clairton	16,381
Clearfield	9,372
Coaldale	6,163
Coatesville	14,006
Collingdale (Darby P. O.)	8,162
Columbia	11,547
Connellsville	13,608
Conshohocken	10,776
Coraopolis	11,086
Corry	6,935
Crafton	7,163
Danville	7,122
Darby	10,334
Dickson City	11,548
Donora	13,180
Dormont	12,974
Du Bois	12,080
Dunmore	23,086
Dupont	5,278
Duquesne	20,693
Duryea	8,275
Easton	33,589
East Pittsburgh	6,079
East Stroudsburg	6,404
Edwardsville	7,998
Ellwood City	12,329
Emmaus	6,731
Ephrata	6,199
Erie	116,955
Etna	7,223
Exeter	5,802
Farrell	13,899
Ford City	5,795
Forest Hills	5,248
Forty Fort	6,293
Frackville	8,005
Franklin	9,948
Freeland	6,593
Gettysburg	5,916
Glassport	8,748
Greensburg	16,743
Greenville	8,149
Grove City	6,296
Hanover	13,076
Hanover township	16,439
Harrisburg	83,893
Harrison township	13,161
Haverford township	27,594
Hazleton	38,009
Hollidaysburg	5,910
Homestead	19,041
Honesdale	5,687
Huntington	7,170
Indiana	10,050
Jeannette	16,220
Jenkintown	5,024
Jersey Shore	5,432
Johnstown	66,668
Kane	6,133
Kingston	20,679
Kittanning	7,550
Kulpmont	6,159
Lancaster	61,345
Lansdale	9,316
Lansdowne	10,837
Lansford	8,710
Larksville	9,467
Latrobe	11,111
Lebanon	27,206
Lehighton	6,615
Lewistown	13,017
Lock Haven	10,810
Lower Merion township	39,566
Luzerne	7,082
McAdoo	5,127
McKeesport	55,355
McKees Rocks	17,021
Mahanoy City	13,442
Meadville	18,919
Mechanicsburg	5,709
Media	5,351
Middletown	7,046
Midland	6,373
Millvale	7,811
Milton	8,313
Minersville	8,686
Monaca	7,061
Monessen	20,257
Monongahela City	8,825
Morrisville	5,493
Mount Carmel	17,780
Mount Lebanon township	19,571
Mount Oliver	6,981
Mount Pleasant	5,824
Munhall	13,900
Nanticoke	24,387
Nanty-Glo	6,217
Narberth	5,817
Nazareth	5,721
New Brighton	9,630
New Castle	47,638
New Kensington	24,055
Northampton	9,622
Norristown	38,181
North Braddock	15,679
Oakmont	6,260
Oil City	20,379
Old Forge	11,892
Olyphant	9,252
Palmerton	7,475
Palmyra	5,239
Philadelphia	1,931,334
Phoenixville	12,282
Pitcairn	6,310
Pittsburgh	671,659
Pittston	17,828
Plains township	15,621
Plymouth	15,507
Pottstown	20,194
Pottsville	24,530
Prospect Park	5,100
Punxsutawney	9,482
Quakertown	5,150
Rankin	7,470
Reading	110,568
Ridgway	6,253
Rochester	7,441
St. Clair	6,809
St. Marys	7,653
Sayre	7,569
Schuylkill Haven	6,518
Scottdale	6,493
Scranton	140,404
Sewickley	5,614
Shaler township	11,165
Shamokin	18,810
Sharon	25,622
Sharpsburg	8,202
Sharpsville	5,129
Shenandoah	19,790
Shippensburg	5,244
Somerset	5,430
South Williamsport	6,033
State College	6,226
Steelton	13,115
PENNSYLVANIA - Con.:	
Stowe township	12,577
Stroudsburg	6,186
Summit Hill	5,406
Sunbury	15,462
Swissvale	16,919
Swoyerville	9,834
Tamaqua	12,486
Tarentum	9,846
Taylor	9,002
Throop	7,382
Titusville	8,126
Turtle Creek	9,805
Tyrone	8,845
Uniontown	21,819
Upper Darby township	56,883
Vandergrift	10,725
Warren	14,891
Washington	26,166
Waynesboro	10,231
West Chester	13,289
West Hazleton	7,583
West Pittston	7,940
West View	7,215
West York	5,590
Wilkes-Barre	86,236
Wilkinsburg	29,853
Williamsport	44,355
Wilmerding	5,662
Wilson	8,217
Windber	9,057
Winton	7,989
Yeadon	8,684
York	56,712
RHODE ISLAND:	713,346
Barrington town	6,231
Bristol town	11,159
Burrillville town	8,185
Central Falls	25,248
Cranston	47,085
Cumberland town	10,625
East Providence town	32,165
Johnston town	10,672
Lincoln town	10,577
Newport	30,532
North Providence town	12,156
Pawtucket	75,797
Providence	253,504
Warren town	8,158
Warwick	28,757
Westerly town	11,199
West Warwick town	18,188
Woonsocket	49,303
SOUTH CAROLINA:	1,899,804
Aiken	6,168
Anderson	19,424
Camden	5,747
Charleston	71,275
Chester	6,392
Clinton	5,704
Columbia	62,396
Conway	5,066
Darlington	6,236
Easley	5,183
Florence	16,054
Gaffney	7,636
Georgetown	5,559
Greenville	34,734
Greenwood	13,020
Hartsville	5,399
Laurens	6,894
Marion	5,746
Newberry	7,510
Orangeburg	10,521
Rock Hill	15,009
Spartanburg	32,249
Sumter	15,874
Union	8,478
SOUTH DAKOTA:	642,961
Aberdeen	17,015
Brookings	5,346
Huron	10,843
Lead	7,520
Madison	5,018
Mitchell	10,633
Rapid City	13,844
Sioux Falls	40,832
Watertown	10,617
Yankton	6,798
TENNESSEE:	2,915,841
Alcoa	5,131
Athens	6,930
Bristol	14,004
Chattanooga	128,163
Clarksville	11,831
Cleveland	11,351
Columbia	10,579
Dyersburg	10,034
Elizabethton	8,516
Greeneville	6,784
Harriman	5,620
Humboldt	5,160
Jackson	24,332
Johnson City	25,332
Kingsport	14,404
Knoxville	111,580
Lebanon	5,950
Maryville	5,609
Memphis	292,942
Morristown	8,050
Murfreesboro	9,495
Nashville	167,402
Paris	6,395
Pulaski	5,314
Shelbyville	6,537
Springfield	5,666
Union City	7,256
TEXAS:	6,414,824
Abilene	26,612
Alamo Heights	5,700
Alice	7,792
Amarillo	51,686
Austin	87,930
Bay City	6,594
Beaumont	59,061
Beeville	6,789
Big Spring	12,604
Bonham	6,349
Borger	10,018
Brady	5,002
Breckenridge	5,826
Brenham	6,435
Brownsville	22,083
Brownwood	13,398
Bryan	11,842
Cameron	5,040
Childress	6,464
Cleburne	10,558
Coleman	6,054
Colorado	6,213
Corpus Christi	57,301
Corsicana	15,232
Crystal City	6,529
Cuero	5,474
Dallas	294,734
Del Rio	13,343
Denison	15,581
Denton	11,192
Eagle Pass	6,459
Edinburg	8,718
Electra	5,588
El Paso	96,810
Ennis	7,087
Fort Worth	177,662
Gainesville	9,651
Galveston	60,862
Goose Creek	6,929
Graham	6,175
Greenville	13,995
Harlingen	13,306
Henderson	6,437
Highland Park	10,288
Hillsboro	7,799
Houston	384,514
Huntsville	5,108
Jacksonville	7,213
Kerrville	5,572
Kilgore	6,708
Kingsville	7,782
Lamesa	6,038
Laredo	39,274
Lockhart	5,018
Longview	13,758
Lubbock	31,853
Lufkin	9,567
McAllen	11,877
McKinney	8,555
Marlin	6,542
Marshall	18,410
Mercedes	7,624
Mexia	6,410
Midland	9,352
Mineral Wells	6,303
Mission	5,982
Nacogdoches	7,538
Navasota	5,138
New Braunfels	6,976
Odessa	9,573
Orange	7,472
TEXAS - Con.:	
Palestine	12,144
Pampa	12,895
Paris	18,678
Plainview	8,263
Port Arthur	46,140
Robstown	6,780
Rusk	[illegible]
San Angelo	[illegible]
San Antonio	253,854
San Benito	9,501
San Marcos	6,006
Seguin	7,006
Sherman	17,156
Sulphur Springs	6,742
Sweetwater	10,367
Taylor	7,875
Temple	15,344
Terrell	10,481
Texarkana, Tex.	17,019
Texas City	5,748
Tyler	28,279
University Park	14,458
Uvalde	6,679
Vernon	9,277
Victoria	11,566
Waco	55,982
Waxahachie	8,655
Weatherford	5,924
Weslaco	6,883
West University Place	9,221
Wichita Falls	45,112
UTAH:	550,310
Brigham	5,641
Logan	11,868
Murray	5,740
Ogden	43,688
Price	5,214
Provo	18,071
Salt Lake City	149,934
South Salt Lake	5,701
Tooele	5,001
VERMONT:	359,231
Barre	10,909
Bennington	7,628
Brattleboro	9,622
Burlington	27,686
Montpelier	8,006
Rutland	17,082
St. Albans	8,037
St. Johnsbury	7,437
Springfield	5,182
Winooski	6,036
VIRGINIA:	2,677,773
Alexandria	33,523
Arlington County	57,040
Bristol	9,768
Charlottesville	19,400
Clifton Forge	6,461
Covington	6,300
Danville	32,749
Fredericksburg	10,066
Hampton	5,898
Harrisonburg	8,768
Hopewell	8,679
Lynchburg	44,541
Marion	5,177
Martinsville	10,080
Newport News	37,067
Norfolk	144,332
Petersburg	30,631
Portsmouth	50,745
Pulaski	8,792
Radford	6,990
Richmond	193,042
Roanoke	69,287
Salem	5,737
South Boston	5,252
South Norfolk	8,038
Staunton	13,337
Suffolk	11,343
Waynesboro	7,373
Winchester	12,095
STATE OF WASHINGTON:	1,736,191
Anacortes	5,875
Aberdeen	18,846
Bellingham	29,314
Bremerton	15,134
Centralia	7,414
Ellensburg	5,944
Everett	30,224
Hoquiam	10,835
Kelso	6,749
Longview	12,385
Olympia	13,254
Port Angeles	9,409
Puyallup	7,889
Seattle	368,302
Spokane	122,001
Tacoma	109,408
Vancouver	18,788
Walla Walla	18,109
Wenatchee	11,620
Yakima	27,221
WEST VIRGINIA:	1,901,974
Beckley	12,852
Bluefield	20,641
Charleston	67,914
Clarksburg	30,579
Dunbar	5,266
Elkins	8,133
Fairmont	23,105
Grafton	7,431
Hinton	5,815
Hollidays Cove	5,137
Huntington	78,836
Keyser	6,177
Logan	5,166
Martinsburg	15,063
Morgantown	16,655
Moundsville	14,168
Parkersburg	30,103
Princeton	7,426
Richwood	5,051
South Charleston	10,377
Welch	6,264
Wellsburg	6,255
Weston	8,268
Wheeling	61,099
Williamson	8,366
WISCONSIN:	3,137,587
Antigo	9,495
Appleton	28,436
Ashland	11,101
Baraboo	6,415
Beaver Dam	10,356
Beloit	25,365
Chippewa Falls	10,368
Cudahy	10,561
De Pere	6,373
Eau Claire	30,745
Fond du Lac	27,209
Fort Atkinson	6,153
Green Bay	46,235
Janesville	22,992
Kaukauna	7,382
Kenosha	48,765
La Crosse	42,707
Madison	67,447
Manitowoc	24,404
Marinette	14,183
Marshfield	10,359
Menasha	10,481
Menomonie	5,582
Merrill	8,711
Milwaukee	587,472
Monroe	6,182
Neenah	10,645
Oconto	5,362
Oshkosh	39,089
Portage	7,016
Racine	67,195
Rhinelander	8,501
Rice Lake	5,719
Shawano	5,565
Sheboygan	40,638
Shorewood	15,184
South Milwaukee	11,134
Sparta	5,880
Stevens Point	15,777
Sturgeon Bay	5,439
Superior	35,136
Two Rivers	10,302
Watertown	11,301
Waukesha	19,242
Waupun	6,798
Wausau	27,268
Wauwatosa	27,769
West Allis	36,364
West Bend	5,452
West Milwaukee	5,010
Whitefish Bay	9,651
Wisconsin Rapids	11,416
WYOMING:	250,742
Casper	17,964
Cheyenne	22,474
Laramie	10,627
Rawlins	5,531
Rock Springs	9,827
Sheridan	10,529

POPULATION

PERCENTAGE OF RURAL POPULATION: 1940

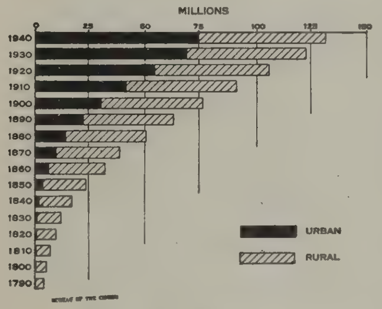


The top map shows the percentage of total population in 1940 that was rural.

Mississippi led with 80 per cent of its total population classified as rural. The map reveals that generally, the East South Central division, particularly, is largely rural - almost 71 per cent; and the New England and Middle Atlantic Areas are dominately urban. The increasing effort of industry to move into the South is partly in response to the available labor. Many of the farmers of the South do not have year-round work on the farm due to the system of farming.

The graph shows the urban and rural population of the U. S. at the time of each census. Note the constant increase in the percentage of urban population. The increase in the proportion of the population engaged in non-agricultural employment and work is even more pronounced.

URBAN AND RURAL POPULATION OF THE UNITED STATES: 1790 TO 1940



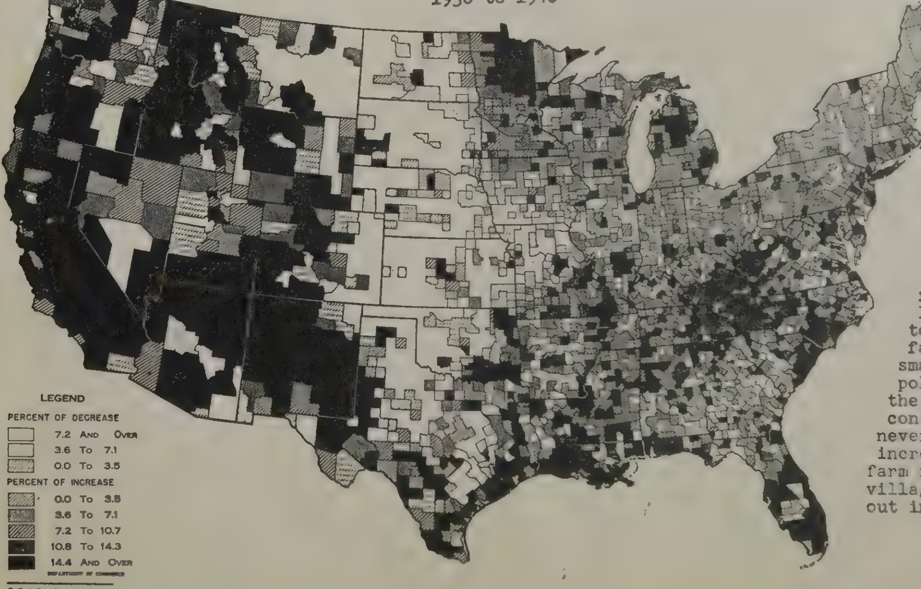
The lower map showing the population changes in the U. S. from 1930 to 1940 is necessarily generalized by county units. It shows, however, an important aspect of population change but the percentage of increase or decrease in population is a relative measure which obscures absolute population changes. A one or two per cent increase for a New York county may result from a much greater absolute change in the total population than a twenty per cent increase in a sparsely settled county in the West.

The total rural population in 1940 was 57,245,573. The increase between 1930 and 1940 was 3,425,350, or 6.4 per cent. This was 2,043,529 less than the increase in urban population which registered an increase of 7.9 per cent.

In the New England, Middle Atlantic, East North Central, and Pacific geographic divisions the rate of rural increase was higher than the urban rate.

In the West North Central division several states showed an actual loss of rural population.

POPULATION CHANGE FOR THE UNITED STATES (INCREASE OR DECREASE) BY COUNTIES 1930 to 1940



1940 Census Data

Rural population is subdivided into rural-farm population which comprises all rural persons living on farms regardless of occupation; and the rural-nonfarm population which comprises the remaining rural population. During 1930-1940 the rural-farm population remained virtually stationary, registering a decrease of less than 0.1 per cent. The fact that it did not decrease further despite widespread drought and technological improvements is attributable to the depression in urban industrial centers.

Rural-nonfarm population is now nearly as large as the rural-farm population having increased 14.5 per cent in the 10 years, 1930 to 1940. However, this rural nonfarm population includes people in small villages distant from metropolitan areas as well as people in the suburbs of large cities. The continued growth of this population, nevertheless, exceeds expected natural increases alone, hence, former rural-farm residents undoubtedly moved into villages and many city dwellers moved out into the suburbs.

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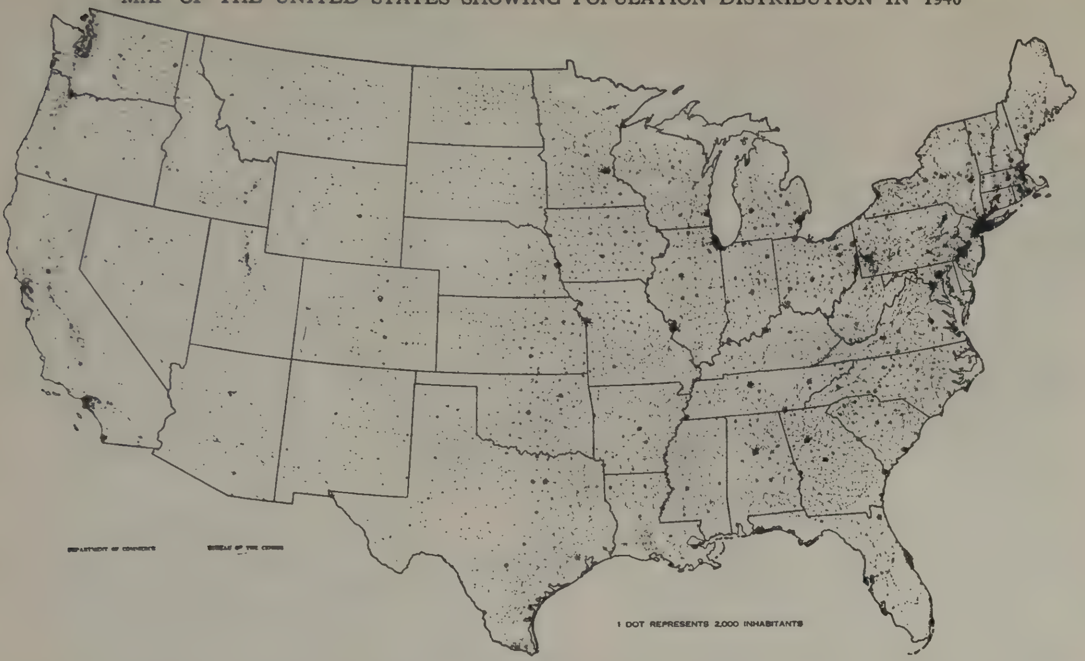
POPULATION DISTRIBUTION

MAP OF THE UNITED STATES SHOWING POPULATION DISTRIBUTION IN 1940

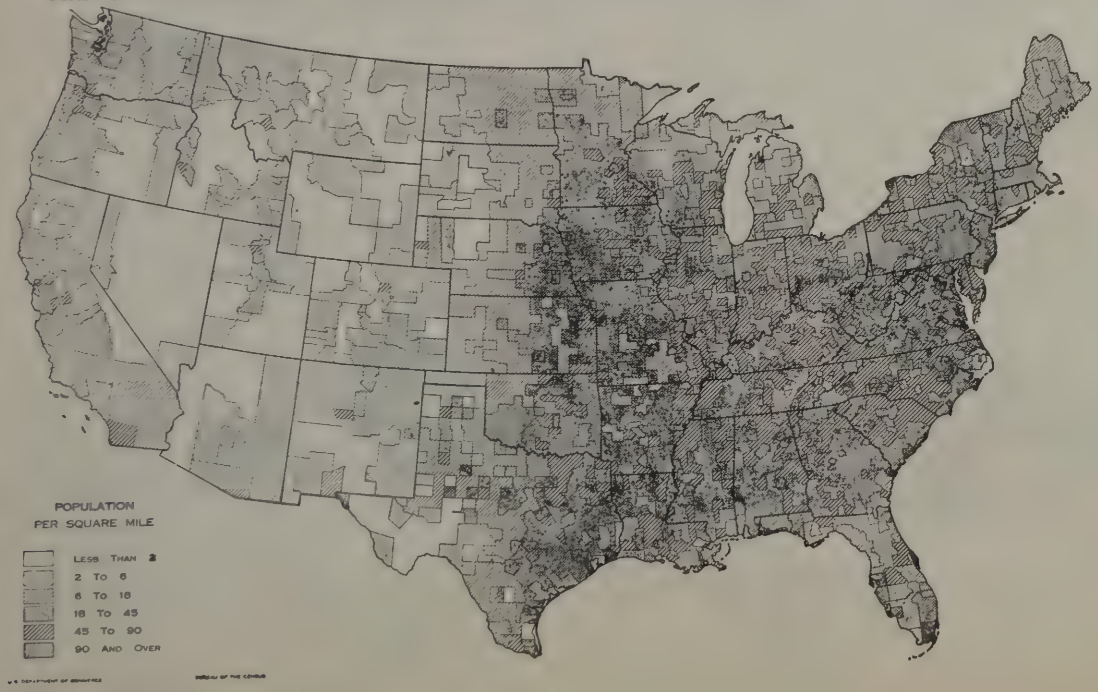


The above map shows 1940 population densities by the variations in spacing between dots. Each dot represents 2000 inhabitants, and dots are piled up to form black patches for cities. In sparsely settled lands, a population thinly distributed over a large area may be represented by a single dot at one central point which is usually the location of a principal town.

The shaded density map at the bottom of the page shows population per square mile by counties. Notice the very evident contrast between the eastern half of the United States and the western half in relation to population per square mile.

Both maps show the extent to which the more humid areas of the United States support the major part of the population. The productive capacity of the soil and the extent of agricultural development is reflected in the density of population.

MAP OF THE UNITED STATES SHOWING POPULATION PER SQUARE MILE BY COUNTIES: 1940



Baby Boom

By True D. Morse

President, Doane Agriculture Service, Inc. and Editor, D.A.S. Agricultural Digest, St. Louis, Mo.

A "BOOM" in marriages and numbers of babies has resulted from the war. For four years there were more marriages in each year than in any prior year in the history of the United States. More babies has been the natural result.

"For every American soldier and sailor killed, half a dozen extra war babies have been added to our population . . .

"Within a year after Pearl Harbor the birth rate jumped more than 30 per cent above the pre-war level." (Domestic Commerce).

The increase of about one million in three years is only a beginning. There will be even more of a baby increase during and following demobilization.

Farmers have more than casual interest in this striking development resulting from the war. There are more babies in families, more grandchildren, and more babies of close relatives. There will be social changes and institutions will be affected. All farmers will experience the economic effects. Future farm profits and family savings will be influenced.

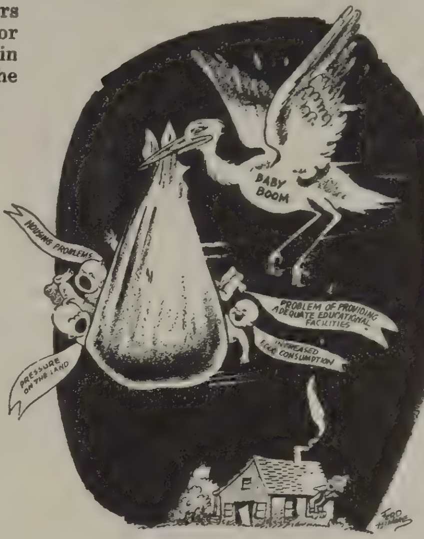
Between 1940 and 1943 there were over one million more marriages than would have been expected, based on past records, if the war had not occurred. The peak was reached in 1942 and was apparently the result of marriages of men in the armed services or those about to be inducted. The extent to which the subsequent decline in marriages will be arrested by the release of men from the armed services remains to be seen.

THE postwar boom will result in even more extra marriages than have already taken place, if the experience following World War I is repeated. A new peak will be reached about 1947. The number of marriages per year remained above the normal level for over eight years following the first World War.

Returning servicemen are now being united with their wives, and there will be a large number of marriages by couples who have waited for the war to end.

The baby boom, as a result of the 1942 marriage peak, has already arrived. Even larger numbers will increase the population figures at a fast rate in the next few years.

Most babies per family are born in rural areas, on farms, and in small towns and villages. The big cities do not raise enough children to maintain their population. New York, Chicago, Detroit, and other great cities would soon pass out of existence if they could not draw on the young people and others born in the country and smaller towns. Almost one extra person for each person born in the cities is needed to maintain the size of these large centers, if they are to make even a small growth.


BABY BOOM
HOUSING PROBLEMS
PROBLEM OF PROVIDING ADEQUATE EDUCATIONAL FACILITIES
INCREASED FOOD CONSUMPTION
PRESSURE ON THE LAND

Farm folks, therefore, can point to the large financial and industrial centers with pride and say, "If it were not for the children that we rear and educate in the rural areas, those great cities would soon perish."

That is the important reason why every city should be so vitally interested in the best of education and medical care for farm children. They are destined to be among the most capable of the cities' future workers and executives.

It can be expected that fully one-half of the children of the war-induced baby boom will grow up in the country. Statistics for 1940 show that of the children and youth under 19 years of age, 22,866,521 were classed as rural. This is slightly in excess of the total for the urban or city areas, which have 57 per cent of the total population.

Beginning next year, expect more children in your grade schools. The numbers will probably increase for the next ten years. Is your school equipped to give these children a superior education? They will need to be better prepared than older generations in order to handle the increasingly complex problems of the world of tomorrow.

Beginning about 1954, expect more students in your high schools. Will your high schools be adequate? Will they have well-equipped laboratories and libraries? Will the instructors be among the best?

These are educational responsibilities that should not be accepted lightly. They begin now. The peak load will be passing through the schools for the next ten to twenty years.

The marriage and baby boom creates an acute housing problem at a time when the nation is already short of living quarters. While young husbands were away at war, it was gracious and patriotic to have the wife and children share a home. When the fathers return, the strain on family relationships will be distinctly less if the young couples and their children can have a separate home.

Where will they go? There are not enough houses. There are not enough farms. Some will be forced to continue living with grandma and grandpa. Big farm and town houses will be altered into duplexes or divided into apartments. New homes will be built.

Among the unfortunate results will be the breaking up of farm units into small, uneconomical acreages. "Many farms are being cut up into small uneconomic units and sold for uses to which they are not adapted. By these processes otherwise good farm land is ruined and social problems for the future are created." (Virginia Agr. College)

Many of those who return to low-income areas will build log houses and cheap homes of native lumber. They will add to the "rural slum" population that is already a major social and economic problem for the Nation.

The population increase will require more farm products. More clothing needs will help bolster cotton and wool prices. Increased food need will progressively affect all farm products used for food.

While the baby boom is proceeding and for the next ten to fifteen years, milk consumption will perhaps be greatly increased. The lack of babies and the decline in the proportion of young people to the total population is causing concern to dairy interest. The American Dairy Association recently released the following statements:

"In 1910, there were slightly more than six persons under twenty for every adult of sixty years or older.

"In 1930, the younger group had decreased to four for every person sixty or older.

"In 1940, the ratio was down to three-and-one-quarter youths for each of the 60-an-up classification.

". . . It will be necessary to increase the consumption of milk and dairy products in the older age bracket if the industry is to maintain markets for the present record milk production by 5,000,000 dairy farmers . . ."

Labor on farms will be increased. In another five years the lads will be driving tractors and both boys and girls will be helping along with the numerous farm jobs which youngsters can handle.

There probably will be less average family savings. It is costly to raise and educate children.

There will be more old-age security for the parents. Most important will be the tremendous satisfactions that flow to parents through their entire lifetime, from children and grandchil-

Continued

uren who have been well reared to be strong of character and who have been given a good education.

Perhaps the foregoing statement is the one with which this discussion should be concluded. The value of babies should not be measured in terms of earnings from child labor. The nation needs a continuing baby boom among our better educated and more prosperous people.

The Nation's AGRICULTURE
DECEMBER, 1945

BUSINESS AND THE BABY BOOM

The effect of the baby boom on business is already being felt and will continue through the years. Here are but a few of the obvious results:

The housing shortage is much more acute because of the increase in the number of babies. Children add greatly to the complications when two or more families "double-up" in one house. Descriminations against renting to people with children are well known.

Industry will need to produce more articles for babies now, and progressively for more youth of various ages as the babies grow up. These demands vary all the way from toys to sporting goods, furniture, and clothing.

Retailers will need to handle the distribution of more goods for children and young people. It will be a source of increased profits. Departments that are designed and equipped to handle this type of business will attract growing interest.

More labor for industry and services of urban centers will be available beginning in 12 to 15 years. This will be 5 to 10 years after the peak post-war demands have been satisfied. It will be in a period of great unemployment if history repeats the pattern worked out following World War I.

A large part--over one-half--of the labor available for the cities will be surplus youth from the farms and from rural areas. It is a source of good labor that will be willing to make major sacrifices to get started in desirable employment.

The future customers of industry are, as always, the babies of today. Alert management is increasingly pointing its educational program to the young folks. Enlarged activities along this line will be needed to progressively follow the war babies through the next 20 years.

The population of the United States will continue to increase rather than slow down, as would have been the case except for the war. It had been predicted by authorities that the peak would be reached about 30 years hence, after which a decline in population numbers would take place.

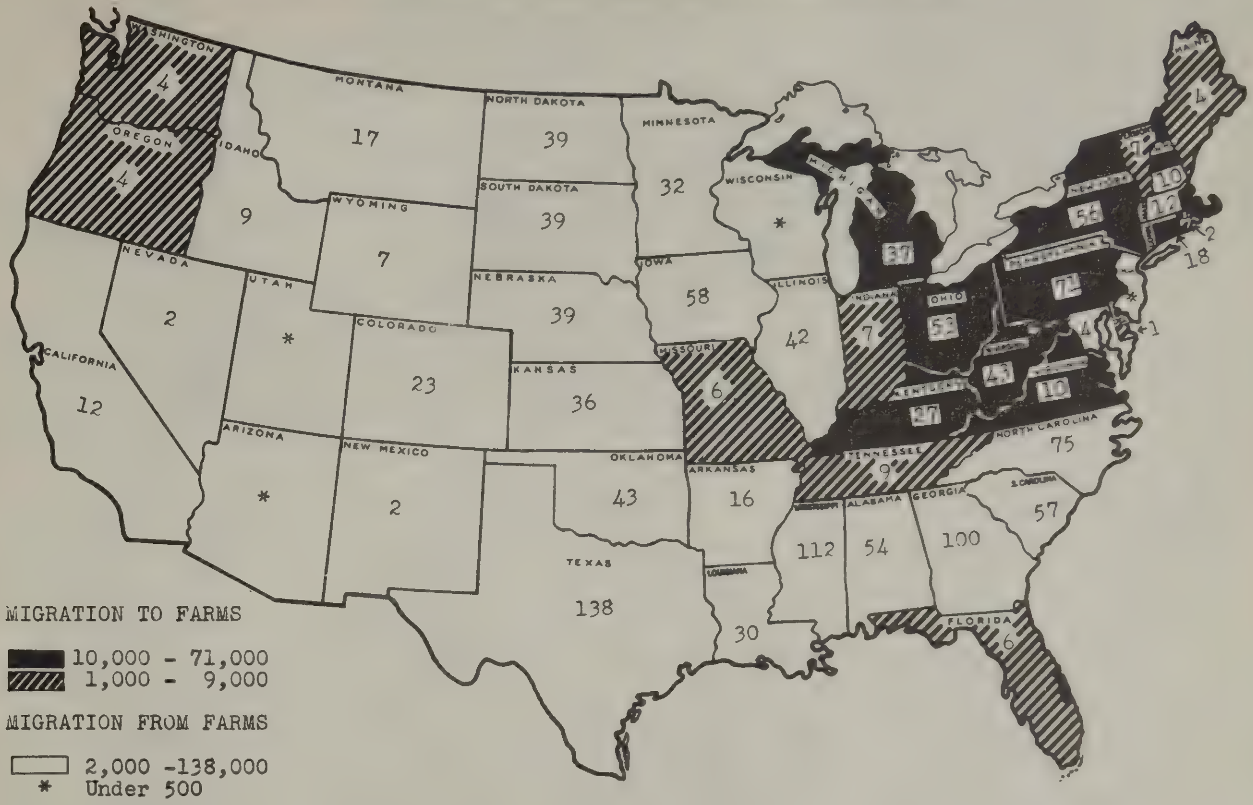
It is clear that for the present, business plans can be projected on the basis of an expanding demand due to further population increases. The rapid up-trend of the past 100 years will continue.

Both OPPORTUNITIES AND RESPONSIBILITIES are involved. Some will exploit the youth. Constructive businesses will find ways of obtaining legitimate profits from the growing population while helping to build the youth into sound useful citizens.

(Printed in U. S. A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

INDUSTRIAL CENTERS SEND DEPRESSION VICTIMS TO FARMS

ESTIMATED NET MIGRATION TO AND FROM FARMS DURING THE FIVE YEARS, 1930-1934



MIGRATION TO FARMS

▇ 10,000 - 71,000
▨ 1,000 - 9,000

MIGRATION FROM FARMS

☐ 2,000 -138,000
* Under 500

Figures in states represent thousands of people
U.S. Total Net Migration From Farms 598,400

Statistics and observations indicate that only the most acute industrial depressions force people to return to farms in greater number than those who are attracted to the city. (See page 872.) Only the most severe economic depressions force a real "Back to the Farm Movement."

The people who return to farms under such conditions consist principally of unemployed who have previously had farm experience. As indicated by the map they do not travel far from the manufacturing centers in seeking refuge on farms.

Many of these people do not remain permanently on the farm but as soon as industrial activity approaches normal return to the towns and cities from which they come. This creates severe problems in farm adjustments, resulting in labor shortage in periods of intense industrial activity and throws an excessive burden of population back on the land when depression strikes. Thus every phase of the community life in these rural areas is in a constant state of change which has far reaching effects on all business interests in the area.

The most migration to farms occurred in states within the dairying and general farming areas. Self-sufficing and part-time farms such as those in the Appalachian and Ozark Mountain areas also receive surprisingly large numbers of people moving out from the cities.

Self-sufficing areas such as mountain and hill countries usually have poor soils and are least able to support increased population at any time much less in such periods of economic stress. Intense "slum conditions" thus develop in rural areas with schools, and local relief facilities swamped with more people than can possibly be properly cared for

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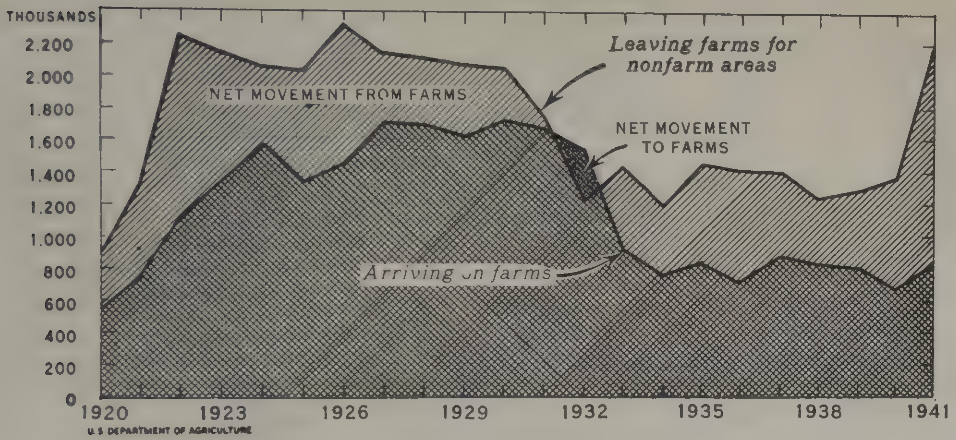
Based on Data of U.S.D.A.

CITY PEOPLE COME FROM FARMS

MOVEMENT TO AND FROM FARMS, 1920-42

BIRTHS AND DEATHS NOT TAKEN INTO ACCOUNT



U.S. DEPARTMENT OF AGRICULTURE

The constant flow of population from farms to cities has been exceeded by the movement to farms only for a short period in 1931 and 1932. This was during the most acute depression years. The net movement away from farms was the largest of record in 1941. Although data for 1942 and 1943 is not yet available it is certain that the movement has continued at an accelerated rate and that the movement from cities to farms has been greatly restricted.

It is normal for the movement to cities to exceed the number of people returning to farms as the city population would not otherwise be maintained.

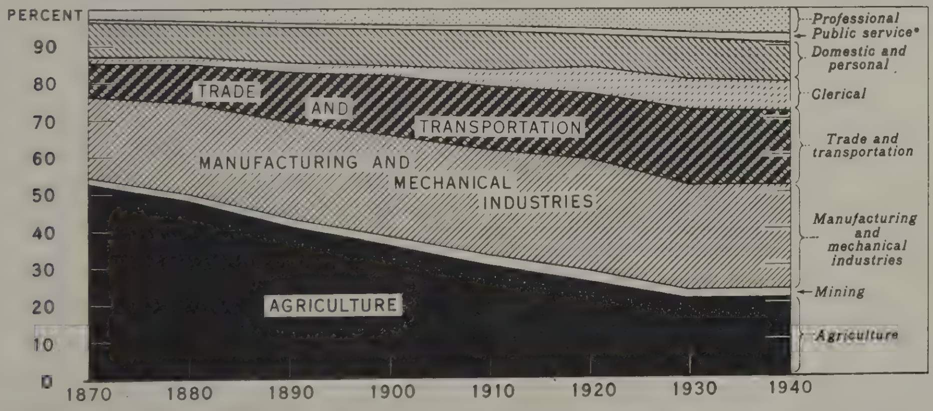
In 1930 seven cities largely of American stock lacked 40 per cent of having enough children to maintain their population. All cities over 100,000 population had a deficiency of 20 per cent. The 1940 census indicates that these deficiencies may be even more acute now.

For eight years prior to 1929 migration from the farms to the cities exceeded 2,000,000 persons each year. Since the depression, migration to cities has averaged near 1,100,000 but increased to almost 2,200,000 in 1941. Migration to farms has been much less since the depression.

Two-thirds of the natural increase in the farm population is in the South where only one-half of the farm families are located. As this shows, our future citizens are coming from the farms of the South in increasing numbers. It is primarily from the southern states, where lack of necessities and frequently want face many families and educational standards average low, that our cities are being replenished with man power.

SHIFTS IN OCCUPATIONS, UNITED STATES, 1870-1940

(PERCENTAGE OF ALL PERSONS OVER 16 YEARS OF AGE ENGAGED IN EACH MAJOR GROUP OF OCCUPATIONS)



* NOT ELSEWHERE CLASSIFIED
DATA FOR 1940 ARE PRELIMINARY: EXCLUDING PERSONS UNEMPLOYED OR ON EMERGENCY EMPLOYMENT
U.S. DEPARTMENT OF AGRICULTURE

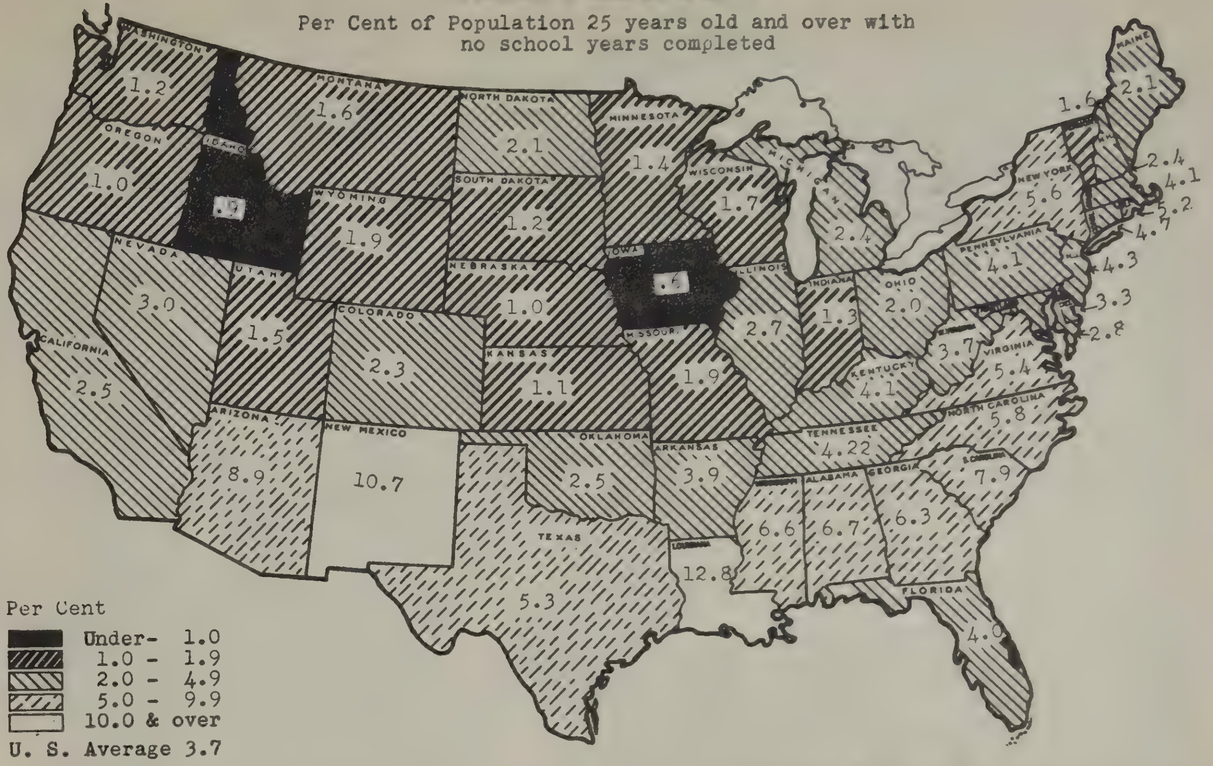
Increased efficiency in farming, particularly in the use of large-scale, power-operated implements, has enabled the agricultural needs of this country to be more than met with a decreasing number of agricultural workers. This is vividly brought out in the above graph.

It is reasonable to assume that the proportion of the various groups within the total population will gradually approach an equilibrium as this country becomes more mature, but the percentage of agricultural workers is still declining although the change from 1930 to 1940 was very small.

As long as city wages and returns from business in the city continue to offer a higher standard of living than farm work and farm operation, a continued net movement from the country to the city can be expected.

ILLITERACY

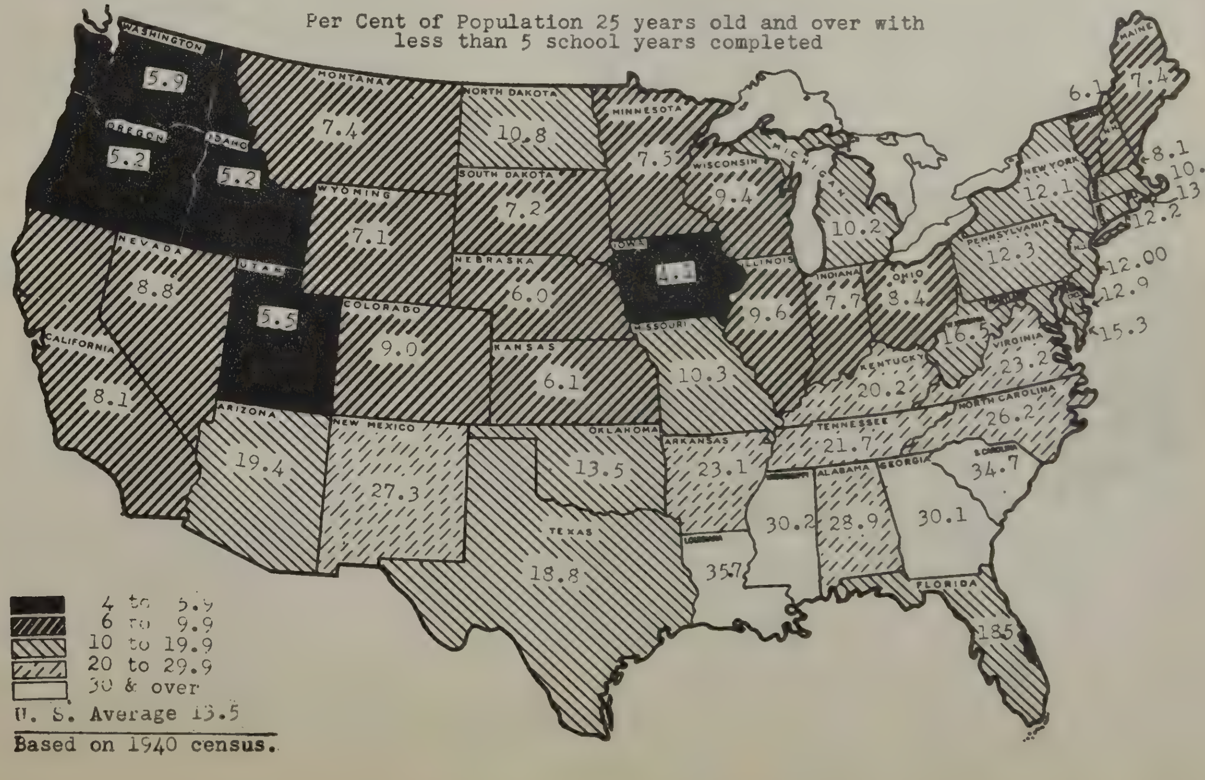
Per Cent of Population 25 years old and over with
no school years completed



Illiteracy and low educational standards tend to be associated with those areas where the percentage of foreign born and non-white population runs highest. In most states illiteracy is confined largely to people other than native whites.

Areas of low educational standards and high percentages of illiteracy should have special consideration in trade and commercial programs. Living, farming, and industrial standards are usually lower in these areas and different responses can be expected from people with little or no education.

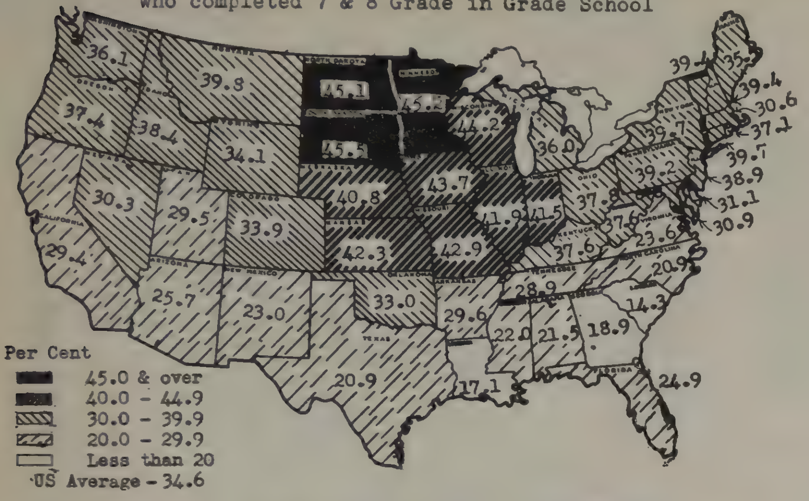
Per Cent of Population 25 years old and over with
less than 5 school years completed



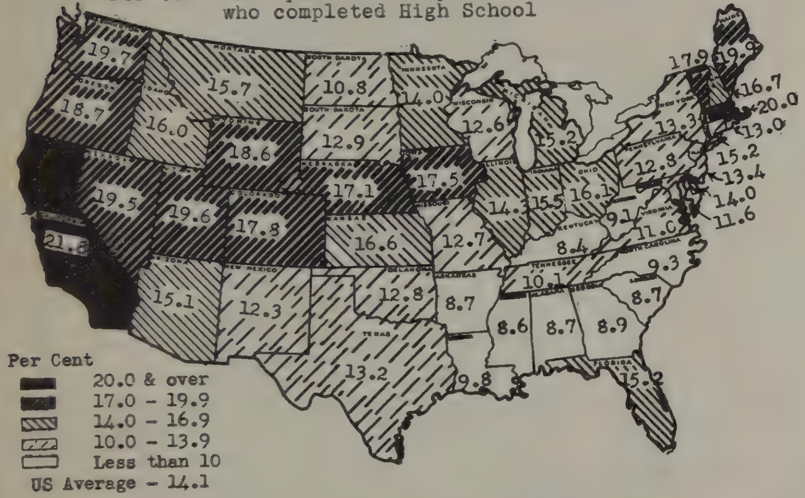
Based on 1940 census.

YEARS OF SCHOOL COMPLETED

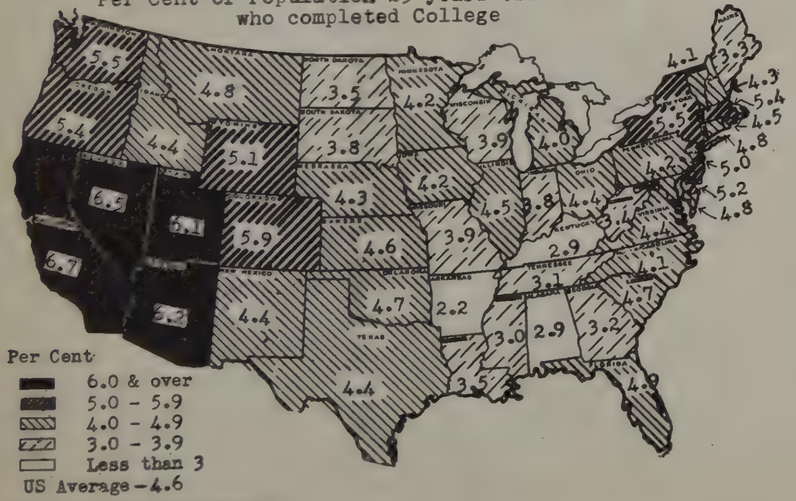
Per Cent of Population 25 years old and over who completed 7 & 8 Grade in Grade School



Per Cent of Population 25 years old and over who completed High School



Per Cent of Population 25 years old and over who completed College



Based on 1940 census.

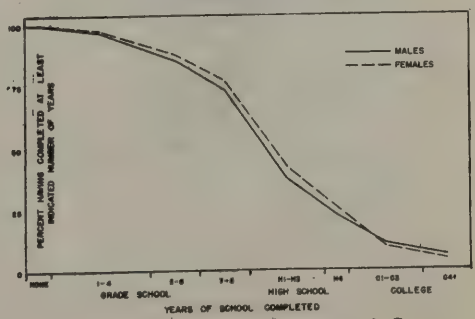
Grade school attendance has been considered essential to the American way of life since early days. The extent to which this goal has been attained is borne out in the map showing the per cent of persons 25 years old and over who have completed elementary grades in school.

Important as grade school has proved to be in our American economy, the high school has come to be considered the minimum standard of school attainment. High school attendance has been stressed more and more in the past 10 to 15 years. It is probable that the next census will show a substantial increase in the per cent completing high school.

College education has become more and more the standard for professional groups. The growth of these great centers of higher learning in the past decade is proof that college education is assuming a distinctive place in our economics. The long time effect of higher education on our national life is only beginning to make itself felt.

So long as high educational standards are provided for all our people, class distinction and race hatred will find little place, and our standard of living both on the farm and in the cities will continue high above that of any other nation in the world.

PERCENT OF MALES AND FEMALES 25 YEARS OLD AND OVER WHO HAD COMPLETED AT LEAST THE INDICATED NUMBER OF YEARS OF SCHOOL, FOR THE UNITED STATES: 1940
(BASE IS NUMBER OF PERSONS REPORTING EDUCATION)



U.S. Bureau of Census

900 Roads, Transportation

900 Roads, Transportation

RURAL ROADS AND THE FARMER

Of the 3.3 million miles of roads, alleys and streets in the United States, 3 million are in rural areas. Over half of these rural roads are not all-weather roads. Many are graded and drained but not surfaced. The remaining are mostly ungraded "mud" roads.

Farmers in the rural areas make up about twenty per cent of our total population. They own nearly 30 per cent of all trucks and 20 per cent of all passenger cars in this country. These figures show further the inadequacy of our rural roads.

The map below shows the percentage of all farms in the states that are located within a quarter of a mile of an all-weather road. In ten states less than half the farms are located near all-weather roads. These are the more sparsely populated western states.

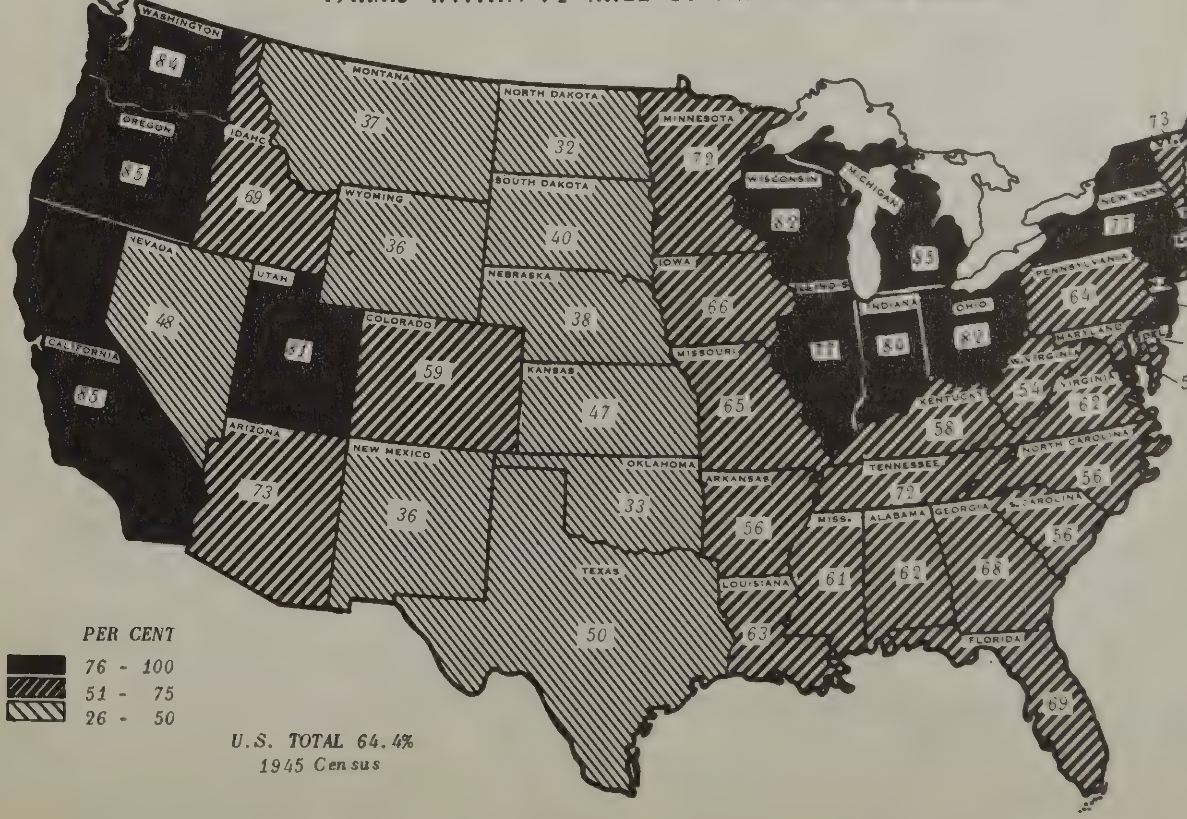
In the commercial farming areas of the mid-west and in the more highly industrialized areas of New England and the west coast, almost all farmers are located within a quarter mile of an all-weather road. In these areas, progress in road construction in the last twenty years has been rapid. Here roads have kept pace with the increasing demands of motor transportation.

For the United States as a whole, progress from 1930 to 1940 was fairly good. In 1930 only 9 per cent of all farms were on paved roads. In 1940, 19 per cent were on paved roads. There were also 5 per cent more farms located on gravel and shell surfaced roads in 1940 than in 1930.

Government relief work (WPA) was a big factor in the expansion of surfaced roads in rural areas during the 1930's. Through improved roads and motor transportation, the standard of living on farms has been raised, efficiency has been increased, and farmers have become more responsive to new ideas and methods. Better and fresher products are brought to market in a shorter period of time with less loss to the farmer.

There are still a lot of roads to be built. In bad, stormy weather, a quarter-mile of mud road can be a serious problem in getting in or out and in sending livestock or grain to market. Many farmers are still isolated each winter by ice and snow or deep mud on the dirt roads. Legislation is being enacted in some states to further improve roads, so that within the next decade, people living on farms will have better market contacts with urban areas.

FARMS WITHIN ¼ MILE OF ALL-WEATHER ROADS



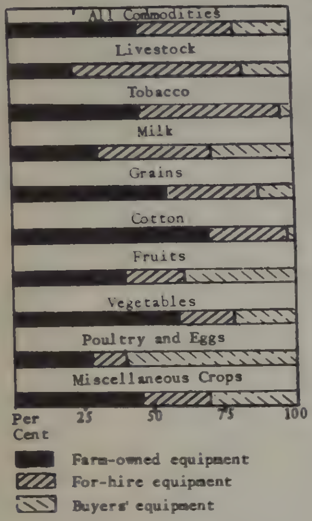
U.S. TOTAL 64.4%
1945 Census

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

FARM TRANSPORTATION

Trucks have become the most important means of transportation from farm to market. Railroads are losing ground steadily. About 89 per cent of agricultural commodities are trucked by farmers direct to a local market or middleman. The other 11 per cent is moved from farms to railroads or docks for further shipment by the grower. (BAE survey)

Per Cent of Agricultural Commodities Moved From Farms To Market in Farm-Owned, Hired And Buyers' Equipment



Nearly half of the agricultural products taken to market leave the farm in farm-owned transport equipment, mostly trucks. "For-hire" trucks carry about one-third, and buyers' trucks haul the rest.

GRAIN: About 54 per cent of the grain leaving farms moves in farm-owned equipment, 34 per cent moves in for-hire equipment, and about 12 per cent moves in buyers' equipment. In the North Central and Western regions, farm-owned equipment hauls a greater proportion of the grain than for-hire and buyers' trucks combined. In the Northeastern region, buyers' trucks haul 57 per cent of the grain, while in the Southern region, for-hire equipment moves 44 per cent, about the same proportion as moves in farm-owned equipment.

LIVESTOCK: For-hire trucks do the principal hauling, carrying 61 per cent of the livestock. Farm-owned trucks carry 21 per cent and buyers' trucks, 18 per cent. Less than half of the sheep and lambs, but over two-thirds of all cattle, calves and hogs shipped to market are carried by hired trucks.

VEGETABLES: More than half of the vegetables move from farms in farm-owned equipment. Hired and buyers' trucks together haul about two-thirds as much as is hauled in farm-owned equipment.

FRUIT: Farm-owned and buyers' equipment are of equal importance in moving fruit from farms, each hauling about 40 per cent of the total tonnage for the country as a whole. Buyers' trucks haul by far the greatest percentage in the Northeastern region.

MILK: More milk moves from farms in for-hire trucks than in any other way. Farmers haul only 30 per cent in their own equipment.

POULTRY AND EGGS: Buyers' trucks carry the greatest portion of the poultry and eggs moving off farms in all regions except the west, where farm-owned equipment carries more than half of the total.

COTTON: This is carried largely in farm-owned equipment, including wagons. Wagons are used to haul about 18 per cent of all cotton moved from farms in the United States.

TOBACCO: This crop is moved in both for-hire and farm-owned equipment -- hauling 52 and 44 per cent respectively.

TIMBER: The greater part of the hauling is done in trucks owned by the mills, but farm trucks are used to haul posts, poles etc.

MISCELLANEOUS CROPS: Farm-owned equipment hauls the greatest portion of the miscellaneous crops moved from farms in the United States and for-hire the smallest portion.

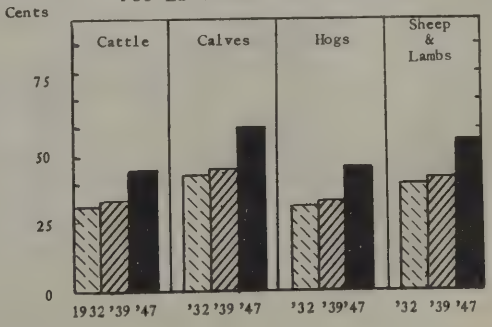
TRANSPORTATION OUTLOOK

Post-war increases in rates charged by both railroads and for-hire trucks have been big. Rates are now about 44 per cent higher than those in effect at the middle of 1946. This is causing farmers and buyers to increase use of their own equipment.

TRANSPORTATION EXPENSES

Average expense of transporting livestock to market increased 30 per cent from 1932 to 1947. Truck transportation of livestock increased in importance during this period. Of the total cattle received at more than 60 principal public markets, 33 per cent arrived by truck in 1932, 62 per cent in 1939 and 66 per cent in 1947. Truck receipts of hogs at these markets represented 50 per cent of the total hogs received in 1932, 68 per cent in 1939, and 70 per cent in 1947.

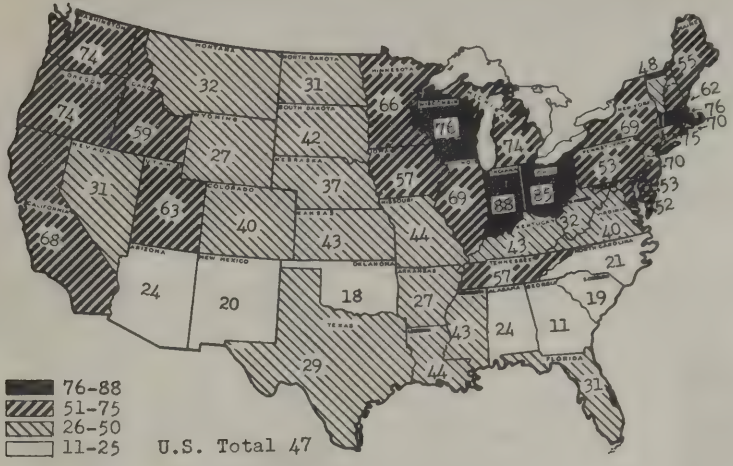
Average Transportation Expenses For Livestock Per 100 Lbs.



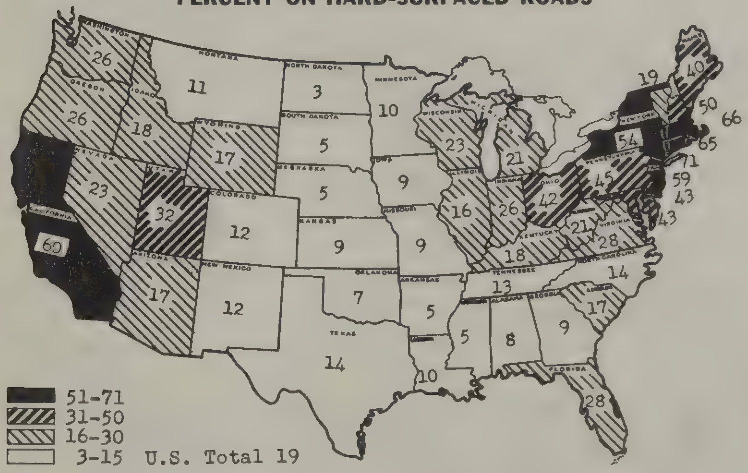
There are many reasons for the growing importance of trucks relative to railroads. The greatest single factor is convenience. With trucks there is no need for driving livestock to the loading docks several miles away. No longer is it necessary to load a few head of stock into a farm wagon and "haul it to town". Another factor has been the relatively high cost of RR transportation for short hauls. Trucks have benefited from tax built highways while RR maintained their own tracks and paid taxes on the right of way.

FARMS ON SURFACED ROADS

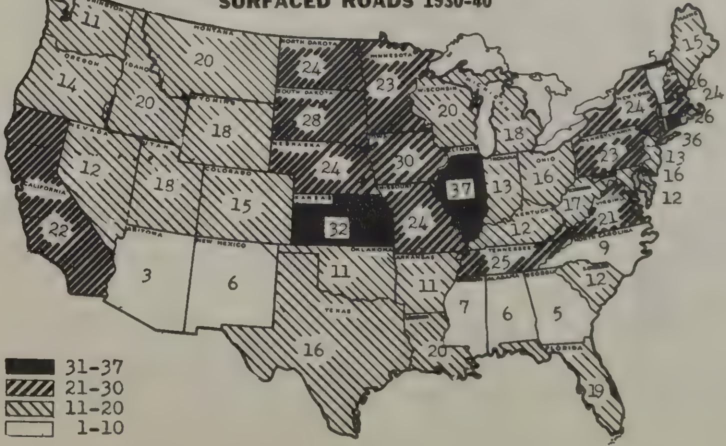
PERCENT ON ALL TYPES OF SURFACED ROADS



PERCENT ON HARD-SURFACED ROADS



INCREASE IN PERCENT OF FARMS ON SURFACED ROADS 1930-40



1940 Census Data

The figures in each state on the first map gives the per cent of farms located on surfaced roads of concrete, gravel, shell, etc.

Better roads appear to be keeping pace with the ever increasing demands of motor-driven vehicles. In 1930 only 9 percent of all farms were on paved roads but in 1940 19 percent were on paved roads. There was also an increase of 5 percent, from 23 per cent to 28 percent, in the numbers reported to be on gravel and shell surfaced roads.

To a large extent the development of surfaced roads has been in the industrial states and other areas of concentrated population. The most rapid expansion in the 9 years prior to 1940 occurred in the corn belt and neighboring states to the west and in the industrial states along the Atlantic Coast.

Government relief work was undoubtedly a major factor in the rapid extension of surfaced roads in the rural areas during the 1930's. This is especially true in the Great Plain states which have been hardest hit by drouth and low prices due to large carryovers of wheat.

Probably no single factor has effected American agriculture more during the last 20 years than the combination of improved roads and the automobile. Their effect apparently has been to:

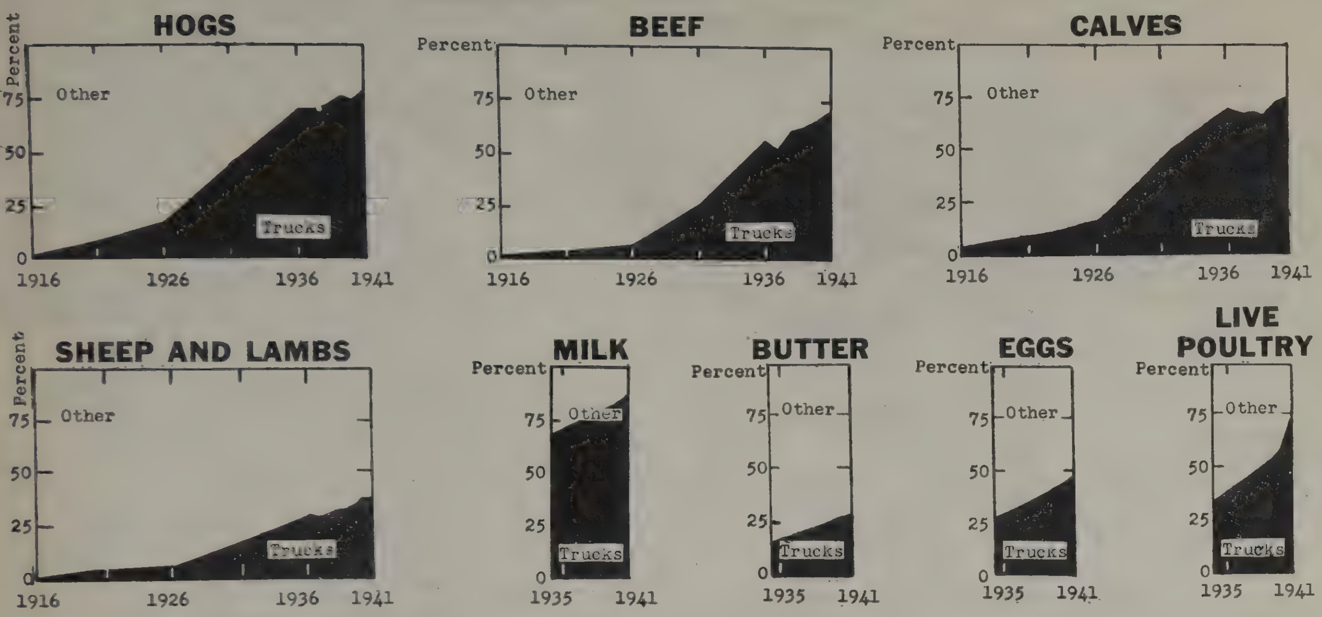
(1) Raise the standard of living,
(2) Increase the efficiency, and
(3) Make farmers more responsive to new ideas and methods.

Detrimental effects, such as higher taxes, increased operating costs, and a tendency to divert attention from business, have also followed good roads, automobiles and trucks.

Improved roads are a definite part of the present economic system and rural counties and farms that do not have them available will become penalized more and more.

FARM TRANSPORTATION PROBLEMS

PERCENT OF RECEIPTS RECEIVED BY TRUCKS



Since 1920 farmers have come to depend primarily on motor trucks as a measure of marketing farm products. The number of automobiles and trucks on farms increased most rapidly from 1920 to 1930. The major shift to dependence on motor trucks as a means of marketing farm products, however, came after 1930.

Date showing the relative importance of truck transportation in the marketing of the principal classes of livestock and livestock products is shown in the graphs above.

Graphic data for the principal farm crops are not available but the following summary indicates something of the farmers total dependence on motor transportation.

Corn - Most of the corn which leaves the farm is moved at least a short distance by trucks. Farm trucks are often used to a limited extent in hauling corn to terminal elevators.

Wheat - Almost all wheat is sold off the farm and nearly all is hauled at least a short distance by truck. Truck transportation is relatively more important in the Palouse wheat belt than in other areas because commercial truck lines are used extensively in moving the crop to mill and seaboard points.

Soybeans, peanuts, flax and other commercial grain crops are nearly always moved at least a short distance by truck.

Seed cotton - more than two thirds of all seed cotton produced is taken to the gin by motor vehicles. During 1940-41 farmers hauled in 86 percent of the crops, ginners trucked in 8 percent and commercial trucks carried about six percent. Approximately 1/5 of the seeds recovered from the ginning of seed cotton is hauled back to the farm. Most of the rest goes on to crushing plants; nearly 2/3 is shipped by truck.

Tobacco - is normally delivered to market in small lots by farm or hired trucks, in the family car, in trailers, or by horse drawn vehicles. The relative importance of these different systems of transportation has not been measured but the percentage delivered by horse drawn vehicles is not large.

Fruits and Vegetables - in 1941 more than 44 percent of total receipts of fruits and vegetables received at 12 leading markets were by truck and almost 15 percent were moved 300 miles or more. Local production up to 40 miles from the major cities moves mostly by truck. Relatively less vegetables and fruits originating far from the consuming centers is handled all the way by truck although short truck hauls are normally required both at the assembly and distributing ends of the haul. Washington, D. C.. Kansas City, and St. Louis are more dependent on long hauls by truck than other principal cities.

Timber - beginning in the late 20's log trucks began to replace logging trains and are now the dominant method of moving logs to the saw mills. In 1942 it is estimated that 52 percent of the saw logs and 29 percent of the pulp wood will be moved all the way to the mills by truck and another 27 percent of the saw logs and 54 percent of the pulp wood will be hauled part way by truck. Most of these operations are by trucks owned by the mills but farm trucks are used to haul posts, poles, fire wood,.etc.

Railroads are not equipped to handle the added burden of farm freight. For example on October 1, 1926 there were 85,447 stock cars but this had declined 38 percent to 54,176 on October 1, 1941. Even assuming the most optimistic outlook on the situation and granting, as has been estimated, that railroads can handle up to 25 percent more livestock than in 1941 it is obvious that farm and commercial trucks must continue to be the principal means of moving livestock to market.

Horse drawn equipment can be used to a limited extent to move livestock and grain to local markets but in the most commercialized farming areas horse drawn equipment has been allowed to deteriorate in the past ten years. Since 1920 there has been a decrease of 43 percent in the horse and mule numbers.

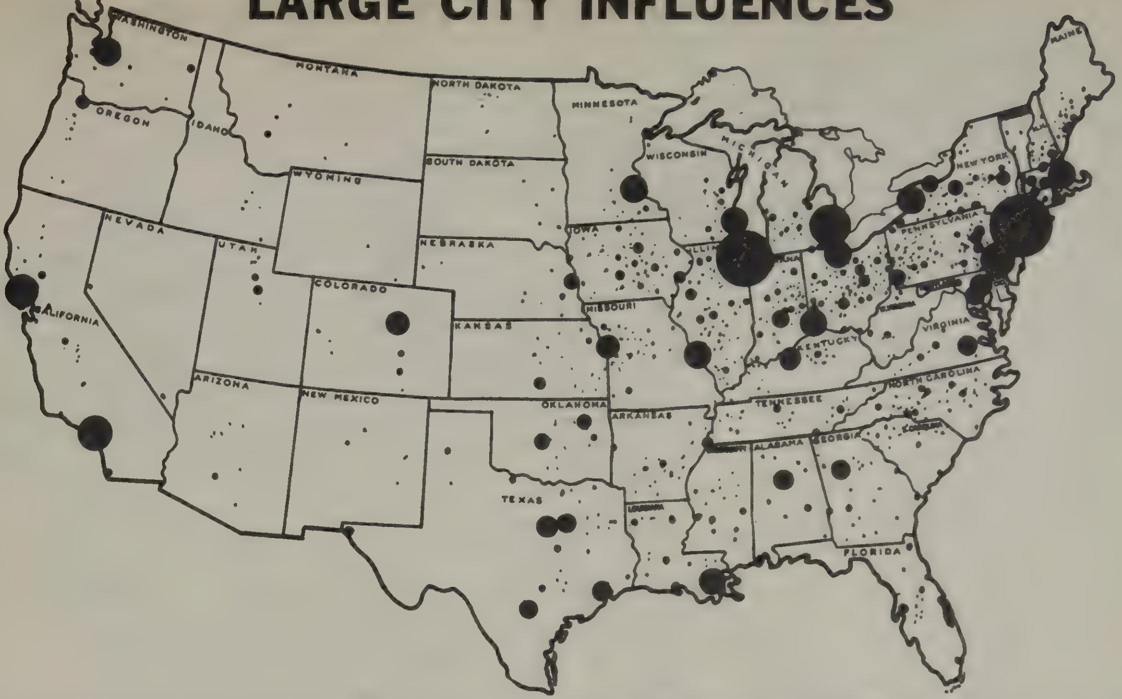
This is a national problem and unless given careful consideration may eventually lead to a tie up in our war effort. The farm transportation system must be maintained. See also Digest Page 352.

Data from U.S.D.A.

950 Industrial, Mineral

950 Industrial, Mineral

LARGE CITY INFLUENCES



About one-half the urban population lives in the Hay and Dairy Belts in the northern and northeastern parts of the United States. Many large cities are also found in most of the other important agricultural states. It is therefore impossible to properly consider many farm areas apart from urban influences.

The effects of large cities on the nearby farms are both beneficial and detrimental. Among the beneficial effects are:

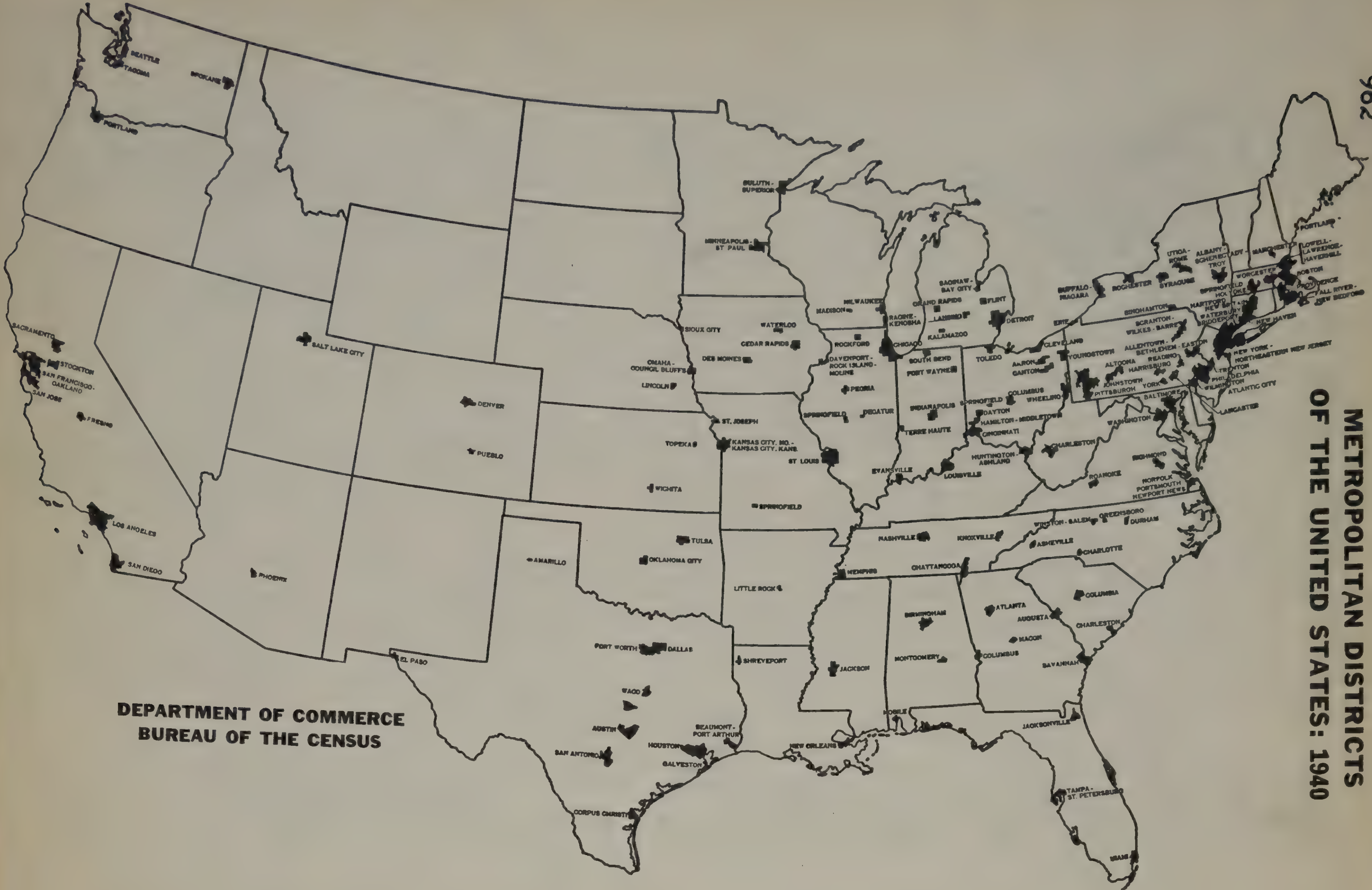
1. There is usually an increase in land values and the salability of land;
2. Prices received for some products may be higher than in other sections;
3. There are opportunities for part-time employment in cities;
4. Milk-marketing facilities have been developed;
5. Truck and poultry products are readily salable;
6. Products of all kinds reach markets with lower transportation costs and less shrinkage and loss;
7. During industrial depressions farm labor is more plentiful and wages lower;
8. More dairying is practiced, which aids in maintaining soil fertility;
9. More improved roads are developed.

Among the detrimental effects are:

1. Under normal conditions farm labor is more scarce and more costly;
2. Taxes are higher;
3. Hope of selling land for suburban development often detracts from interest in farm operation;
4. High land values often force overcropping of land;
5. Farmers are bothered by thievery, even to the point of necessitating changes in the type of farming;
6. The non-farming population of the rural communities often proves a burden, particularly in times of depression;
7. Foreign or racial elements are often disturbing factors.

Urban influences change and continue to modify farm values and practices. These effects will be intensified rather than lessened in many communities as the industrial development of this country progresses.

METROPOLITAN DISTRICTS OF THE UNITED STATES: 1940



DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

1000

Rural Appraising

1000 Rural Appraising

DOANE AGRICULTURAL DIGEST
Facts and Opinions From the Oldest and Largest Organization Engaged in Farm Management, Rural Appraising and Agricultural Research.

THIS MONTH IN AGRICULTURE

From Washington --

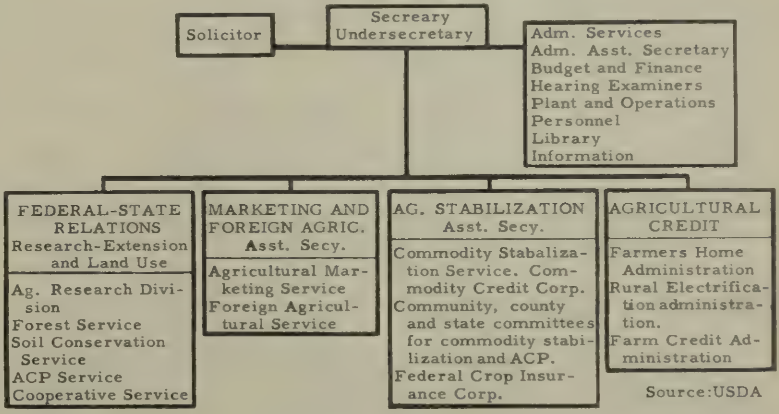
LIVESTOCK GROUPS GENERALLY OPPOSE DIRECT CATTLE SUPPORTS -- Eighteen of the 23 major livestock groups are opposed to price supports on cattle. Four of the groups favor some sort of cattle price support, but did not state preference. These livestock groups were asked by Secretary Benson for advice on proposals made by the House Agricultural Committee. The House proposals called for price supports on choice grade cattle, increased purchases of beef products, and direct government buying of cattle. The concensus of opinion seems to be that a government program supporting cattle prices will create more problems that it would solve.

TO GET SUPPORT PRICE IN 1954 you must not exceed your 1954 wheat acreage allotment or any other 1954 allotments which have been or will be established for basic commodities grown on your farm. For crops under quota, marketing cards will be needed for all farms in which you have an interest. The national average support price for 1954 wheat will not be less than $2. 20 a bushel.

1954 CROP OATS, BARLEY, RYE, AND GRAIN SORGHUM will be supported at 85 percent of parity for another year. The price support rate for 1954 production, reflecting 85 percent of parity as of September 15, 1953 will be: Oats, 75 cents per bushel; barley, $1.15 per bushel; rye, $1.43 per bushel; and grain sorghum, $2.28 per cwt. All rates -- national average. 1954 crop flaxseed will be supported at 70 percent, or $3.14 a bushel instead of this year's $3.79 or 80 percent of parity.

REORGANIZATION OF USDA is designed for better service to farmers. Marketing Research and Extension will be made stronger. State soil conservation offices will be strengthened and regional offices have been eliminated. An agricultural marketing service will be established which will absorb a major part of the marketing, research, and service functions of the Production and Marketing Administration and Bureau of Agricultural Economics. Widespread research activities will be integrated into a new agricultural research service. The present state, county, and community farmer committees will be retained to help administer agricultural programs.

U.S. DEPARTMENT OF AGRICULTURE
Reorganization


Solicitor
Secreary Undersecretary
Adm. Services
Adm. Asst. Secretary
Budget and Finance
Hearing Examiners
Plant and Operations
Personnel
Library
Information
FEDERAL-STATE RELATIONS
Research-Extension and Land Use
Ag. Research Division
Forest Service
Soil Conservation Service
ACP Service
Cooperative Service
MARKETING AND FOREIGN AGRIC.
Asst. Secy.
Agricultural Marketing Service
Foreign Agricultural Service
AG. STABILIZATION
Asst. Secy.
Commodity Stabalization Service. Commodity Credit Corp.
Community, county and state committees for commodity stabilization and ACP.
Federal Crop Insurance Corp.
AGRICULTURAL CREDIT
Farmers Home Administration
Rural Electrification administration.
Farm Credit Administration

Source:USDA

CLEARER UNDERSTANDING NEEDED of price support operations. When the government buys farm products it is bound by law to sell them at a profit -- unless they deteriorate in storage. During the past 20 years, USDA reports a loss of $1\frac{1}{2}$ billion in its price support operations. Biggest loser has been potatoes, $478,000,000; then eggs, $190, 000, 000; wheat, $95, 000, 000; peanuts $93, 000, 000; wool, $92, 000, 000; flaxseed and linseed oil, $66, 000, 000; dried milk $63, 000, 000. Price support operations have shown a profit in cotton of $238, 000, 000; and tobacco $1, 600, 000.

U. S. GOVERNMENT TO HELP STATES HELP FARMERS. USDA will pay up to $10 per ton for one-half the transportation cost of moving hay into drouth areas. States must submit a plan that is agreeable to USDA who will share in the cost of transportation. States are to provide funds where possible and will have to buy and distribute the hay.

Railroads that serve both the western and southern states have agreed to a 50 percent rate reduction for moving hay into drouth disaster areas. Earlier a similar arrangement had been in effect for moving livestock from designated drouth areas to grazing areas in non-drouth states.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U. S. A.)
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New Ideas --

CONSUMERS WILL PAY MORE to get clean potatoes, Maine potato people learned in a recent USDA-state cooperative marketing project. When potatoes were washed and packaged in 10-pound and 50-pound bags, they brought 20 cents more per hundred pounds than unwashed potatoes. Tests showed that putting variety name on the label led to repeat orders. Label potatoes as to variety, size more accurately (in 3 sizes), and market in attractive consumer packages.

PROFLORAN, A NEW COMPOUND TO TREAT SICK CATTLE AND SHEEP, is available to veterinarians throughout the U.S. This formula aids sick cattle and sheep by restoring to normal the countless types of bacteria in the rumen. Profloran promotes and stimulates growth of rumen bacteria in the way that fertilizers increase plant growth. This culture is added to the daily ration of sick and ailing livestock. Scientists at Jensen-Salsbery Laboratories, Midwest Research Institute, Kansas City, and many veterinarians over the nation cooperated in profloran development and testing.

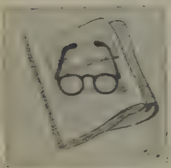
COMBINE MAY HARVEST YOUR CORN. The front of a corn binder is attached to the platform of a combine. The regular threshing cylinder is replaced by a corn shelling unit. Experimental work during the past 5 years at the University of Nebraska indicates picker-sheller type corn harvesters are most efficient when moisture content is relatively high -- 25 or 30 percent. Corn may be dried by using heated or unheated forced air. (This machine is in the experimental stage.)

LP-GAS IS EFFICIENT if you have bulk storage and your tractor is equipped to use it. The high cost of storage and handling, and initial cost of converting from regular to LP-gas are road blocks to reduced tractor operating costs. Any gasoline burning tractor can be converted to use LP-gas but if the tractor is more than 5 years old, it probably will not pay to convert it to LP use, says Roger Yoerger of Iowa State College. Manufacturers are now producing many LP tractors at the factory at slightly higher prices than for comparable gasoline tractors.

SWEET CORN DEHYDRATED BY NEW PROCESS can be dried and kept indefinitely. The moisture content is lowered from 75 percent to 5 percent. At the same time weight is reduced about 75 percent and volume about 60 percent. Corn is cut from the cob, cleaned and blanched. It's then air-cooled to room temperature, dipped into a sulfite solution to prevent browning, and put into a drier. The project was designed, according to A.I. Nelson, who headed up the research at the University of Illinois, to see how fast corn could be dried with the least amount of damage to quality.

MULTI-PURPOSE INSECTICIDE MIST BLOWER developed through cooperative research by the USDA and the Connecticut Experiment Station. This bantam insecticide mist blower can be fitted with different insecticide outlets to make it suitable for many spraying jobs. The mist blower will be useful to truck gardeners, fruit growers, and nurserymen in all parts of the country, as it combines light weight (about 200 pounds) and reasonable cost with all-around ability. USDA's Bureau of Entomology and Plant Quarantine cooperated in the research.

Worth Reading -- (Briefs of the month's best reading from farm magazines of over 1 million circulation.)



WHAT'S AHEAD IN PRICE SUPPORTS? As a farmer, you can rest assured you are by no means a forgotten man in Washington. Any notion that we must change farm programs every time there is a change in the national administration, has been disproved during the past year. It is apparent that the general pattern of farm programs will be continued, but will be flexible to adjust to commodities. The final decisions will be made by your representatives in congress. Successful Farming, November, p. 35.

THE FAMILY FARM FACES A CHALLENGE. National land policies from early days have encouraged family-sized farms. After all has been said about large scale efficiency and small scale farm living, the facts are that large farms over 500 and 1000 acres are getting larger and small farms have been combined, but the farms from 180 acres to 500 acres have remained the same. This group, with modern machinery, can be the family farm with changes and adjustments made to keep up in a fast changing world. Country Gentlemen, November, p. 33.

WHY THE WORLD IS STEALING YOUR WOOL MARKET. The main reason is that we are 50 years behind our competition in wool handling. There are other reasons: Cheaper production -- currency manipulation -- our own trade policies -- but these are only minor. The real trouble is 3/4 of the wool consumed in the U.S. is imported. Why? Because manufacturers can buy better prepared and better quality imported wool and will pay more for it. These other wool-producing countries have two secrets: Scientific grading -- every clip is divided into value classes -- and public auctions. As a Wyoming sheepman, Frances Warren, put it, "We're still operating on a basis of horse trading and ignorance. It's time we used some science". Farm Journal, November, p. 36.

SUGGESTIONS TO PURCHASERS OF FARMS

Making a mistake in selecting a farm is likely to be serious. Commonly it results in years of wasted effort and the loss of hard-earned savings. Many farmers who are struggling to make a living on poor farms would earn a satisfactory income if they were on good land. Others who have purchased poor farms have abandoned them after investing their savings and spending several years in an effort to make a living. On the other hand, capable farmers on good land usually make a satisfactory income and are able to enjoy the advantages of farm life. The importance of extreme care in selecting a farm cannot be overemphasized 1/

PERSONAL REQUIREMENTS FOR SUCCESS

Some knowledge of farming, some previous farm experience are highly desirable for those who set out to operate a farm Farming successfully today demands much more technical knowledge than was required a generation ago. Soils have become depleted and require skilful management to restore their fertility. Insects and diseases have become more prevalent and must be controlled by appropriate measures if crops and livestock are to be grown at reasonable costs. Breeds of livestock and varieties of crops have been greatly improved, and proper selection is necessary to meet competition. 2/

Deciding the Type of Farming

The type of farming in a region which has been settled for many years is usually the result of experimentation by hundreds of farmers. The prospective farm owner should be guided by the experience of the best farmers in a community as to the types of farming which pay best in that community. If he wishes to buy a dairy farm the safest course to follow is to buy a farm in a community where dairy farmers are prosperous. If he wishes to grow wheat he is less likely to make a mistake if he buys in an area where wheat is commonly grown. Many failures are directly traceable to attempts to introduce untried farm practices on a large scale in areas where they are not suited. 6/

- - - types of farming are the result of years of experimentation by farmers. The most profitable types have been continued; those which were less profitable or unprofitable have largely been abandoned.

The newcomer to a region should not regard lightly the accumulated experience of local farmers. He should plan to follow the same type of farming as that of most of his neighbors, at least until he has had enough experience in the community to know whether another type is adapted to that region. If he has definite preferences as to type of farming, he should go where that type is successful. 1/

IN SELECTING a farm, the prospective purchaser should consider only those farms that are adapted to one or more enterprises which may be expected to be profitable over a period of years.-- Also, he should make certain that these enterprises will make up a relatively large proportion of his business

Although economic conditions are continually changing, past experience is generally the best single guide as to what enterprises are likely to pay best in the future. The returns per hour of labor on different farm enterprises—that is, what is left to pay for each hour of labor after all other costs are paid—indicate their relative profitableness.

The most successful farmers concentrate their efforts on the enterprises best adapted to their farms. Only enough of the less profitable enterprises are included to complete rotations or to use those farm products which otherwise would be wasted.

A few farmers who obtain high yields, produce efficiently, or obtain premium prices are able to make money on enterprises not generally profitable. The newcomer to a region, however, usually will find it to his advantage to select enterprises which the experience of a large number of farmers has shown to pay best. 1/

SIZE

IN ANY type of farming, over a period of years, large farm businesses return larger labor incomes than do small ones. This does not mean that every large farm earns more than every small one. In fact, some large businesses lose more than it would be possible for small businesses to lose. In years when the prices of farm products are very low, many large businesses have large losses. The mere fact that they do more business makes it possible for them to lose more. Large businesses also lose more than small ones if crop yields or animal production are low, if labor is used very inefficiently, or if, for any other reason, unit costs are raised above unit selling prices. Over a period of years, however, large businesses with high rates of production pay best. 1/

PRESENT AND POTENTIAL PRODUCTIVITY

Productivity is the most important factor influencing the value of agricultural land. In valuing land it is desirable to distinguish between present and potential productivity. Present production is determined by soil characteristics, natural forces and management practices while potential productivity is the inherent power of a soil to produce 3/

There is always the danger of undervaluing potentially good land in poor condition and of overvaluing potentially poor land in good condition. Since potential as well as present productivity levels are not the same for all kinds of soils, a thorough knowledge of soils is essential in estimating the value of agricultural land. 3/

A common mistake in valuing farm real estate has been the failure to detect the wide differences existing between the productivity value of individual farms. A superficial examination of two farms may indicate little if any difference in their value. Closer inspection, including a study of the surface soil, subsoil, drainage, erosion and fertility, will often, on the contrary, bring to light a surprising variation in the potential productivity of these two apparently similar farms. 3/

In choosing a farm, the most important considerations to be given to soils are the following:

1. *Texture of the soil particles.*—If the soil particles are very fine, the soil will be hard to work. If they are coarse, the soil will very likely be drouthy. The texture of soil that is desirable for some crops is not so suitable for others.

2. *Permeability.*—Soils should be sufficiently permeable to permit ready penetration of water and roots, but not so permeable as to be drouthy.

3. *Organic-matter content, acidity, and supply of nutrient elements.*—These are important factors in determining the producing capacity of soils. They are not so fundamentally important, however, as texture of soil particles and permeability, for organic-matter, plant-nutrient deficiencies, and acidity can be corrected, but neither texture nor permeability can be changed. Organic-matter content can be judged by the color of the soil, the darker-colored soils usually containing the most organic matter; and tests can be made to ascertain acidity and content of nutrient elements. 2/

BUILDINGS

THE PROSPECTIVE purchaser of a farm should consider carefully the farm buildings. They should be in good repair and should be neither too large nor too small for the amount and type of farming to which the farm is adapted.

Good buildings usually are found on good land and poor buildings on poor land, but not always. The size and the condition of the buildings ordinarily indicate the quality of the land, but the land and the buildings must each be considered on its own merits.

Usually it is cheaper to buy a farm with the buildings already constructed than to buy the land and construct the buildings. In fact, it is often possible to buy a good farm with good buildings for less money than it would cost merely to construct the buildings.

One must be careful to avoid over-investment in buildings. The amount of barn rent that a cow can pay or of henhouse rent that a hen can pay is limited. 1/

CONVENIENCES

AN ALL-WEATHER road, central-station electric power, a safe and dependable water supply, a telephone, running hot and cold water, a bathroom, and a furnace are among the conveniences that are more and more coming to be considered essential to a satisfactory farm life.

The prospective purchaser of a farm should make certain that there is a year-around water supply both for use in the house and for the livestock. On a dairy farm, it is important to have water always available in the pastures. Water piped to the barn and laying houses is both convenient and economical. On a fruit farm, not only should there be enough water for spraying but it should be convenient to the orchard.

Running water, a bathroom, a furnace, and a telephone, while not absolutely necessary, add much to the satisfaction of farm life. 1/

BUYING A FARM

COMMUNITY

A FARM is more than a business; it is also a home. Before buying a farm, the prospective purchaser should consider its desirability as a place to live as well as a place to make a living. Among the various questions to which he should find the answer are the following:

Is there a large enough proportion of good farming land in the neighborhood so that the farmers have enough income to support a good school, a good grange, and good churches? To what grade school will the children go? How far is it from the farm? Is there a school bus? How far is it to the high school? Does the town have a large bonded indebtedness so that taxes are likely to be high? Are the people of the community the type with whom I would like to associate? Are the young men staying on the farms of the neighborhood or are the farms being operated by the older generation?

It may seem wise to purchase a farm even though all of these community advantages are not so favorable as might be desired. If all these questions are considered, however, the purchase will be made with a full realization of the limitations of the community. 1/

MARKETS

Farms close to market usually sell for more than those farther away, and costs of production usually are higher. Net farm prices, however, are enough higher to more than make up for these extra costs. Prospective farm purchasers should consider carefully market opportunities. 1/

Adequate and accessible markets are essential to a reasonable cash income from surplus production, and they are especially necessary if perishable products which command a price premium if marketed fresh at frequent intervals are to be produced on a commercial scale. 2/

Roads.

Since this is an age of hard-surfaced roads with automobile and motor-truck transportation, a farmer whose farm is on a dirt road has a serious handicap. This is especially true in areas where market milk, eggs, fruits, vegetables, and other bulky and perishable products are produced. 6/

Location on an all-weather road is almost a necessity for most small-farm dwellers. Part-time farming requires ready access to outside work so that time may be used advantageously. The type of roads over which one must pass and the distance he must travel to reach a church, school, hospital, and a market must be considered when a farm is being chosen. 2/

Farms on hard roads generally sell for more than do those on dirt roads, but usually the advantages of a site on a hard road more than offset the additional cost. If the hard road is well traveled, products may be sold at the roadside. Dealers in fruits, vegetables, and poultry products frequently visit farms on hard roads and within easy trucking distance of the cities. Each of these market opportunities is less frequently open to farmers on dirt roads. Farmers on hard roads also have lower costs of hauling products to market and supplies to the farm than do farmers on dirt roads. Hard roads are particularly important if milk must be hauled to the milk plant daily 1/

TAXES

What relation have taxes to farm profits? In some cases farm lands have been appraised as of no value because the taxes were so great that no income could be expected. Fortunately this situation is not general, but no farmer can longer buy land blindly, and an important factor in the ownership of land is the tax assessed against it. 5/

> "Taxes are definitely and permanently attached to and assessed against land in a manner impossible of separation. They constitute a form of prior lien or annual payment deductable before profits are calculated. They are liabilities passed on with the land from owner to owner as regularly as a weed pest, an inferior soil or a bad location." *D. Howard Doane*

Tax rates have an important bearing on land values and should be carefully considered in the purchase of a farm.

The tax rate very materially affects the value of the farm. Five cents an acre added to the tax bill cuts a dollar from the capitalized value of that acre. There was a difference of $1.29 per acre between the highest and lowest tax rates among these farms. This accounts for a difference of $25.80 in value per acre 4/

PERSONS RETURNING TO THE LAND

Persons planning to return to the land should realize that farming conditions differ greatly from what they were twenty-five or thirty years ago. Before buying a farm in the neighborhood where one grew up or before "taking over the old home farm," one should investigate present opportunities on such farms. Many farms which once provided a fair standard of living no longer pay.

Taxes are more than double those in 1910 to 1914. Farm wages are high as compared with those in 1910–1914, and indications are that they will go higher. Farms adapted to the use of machinery are gaining a greater and greater advantage over those which cannot use machines economically 1/

SUMMARY

1. Poor farms are usually over-valued as compared to good farms.
2. The following are aids in forming an opinion as to the value of a particular farm: soil maps, condition of growing crops, kind of crops raised, financial success of previous operators, amount of livestock that has been carried, opinions of neighbors, nature of buildings, location and the amount of unimproved lands.

Soil Maps: Soil maps are valuable but do not tell the whole story.

Condition of Growing Crops: Crops that look well are a favorable indication, but one should see a farm in both wet and dry seasons.

Kind of Crops: In general, a large acreage of corn, wheat, alfalfa, and barley in good condition suggests a productive soil.

Financial Success of Previous Operators: If previous operators have made money, it is a favorable indication. If previous operators have not been financially successful, make a thoro investigation before accepting poor management as the explanation of lack of success.

Amount of Livestock: Any evidence as to the amount of livestock that has been fed from the crops raised is a guide as to productivity.

Opinions of Neighbors: Opinions of neighbors, bankers, and others are valuable if one is certain that he is getting disinterested opinions.

Buildings: Good buildings are desirable, but good soil does much more to increase earnings than do good buildings.

Location: Location on a road that is open all year and is near good schools and churches is particularly important from the home standpoint. Good roads may have considerable effect on earnings.

Unimproved Land: A farm with a large proportion of tillable areas is much more valuable than one with a large amount of unimproved land. 4/

APPRAISAL SERVICES AVAILABLE
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American Society of Farm Managers and Rural Appraisers
Farm Foundation 600 S. Michigan Ave. Chicago, Illinois

The public has a right to expect that any business entrusted to members of the American Society will be handled efficiently, honestly, and ethically.

A Committee on Professional Advancement and Ethics is maintained for the purpose of seeing that the confidence of the public in the members and in the Society is at all times merited.

And so, when you go shopping for an appraisal, you can do yourself no greater wrong than to be willing to accept and be satisfied with somebody's guess, a snap judgment answer as it were, which costs you little and is worth still less. It can only lead you astray, build up your hopes and finally let you down.

Keen minded, alert, experienced, qualified Rural Appraisers weigh every factor, dig into each possibility, and arrive at an appraisal, an invoice, an answer that will not let you down through false hopes. These men, of necessity, also have as a background of experience a deep insight into and knowledge of Farm Management and its application to your problem. They have training and ability. You owe it to yourself to seek them out and use their skill in obtaining the right answer which is of such great importance to you. *Journal of the American Society of Farm Managers and Rural Appraisers.*

THE EDITOR

Agricultural College Bulletins: 1/New York 412, 2/Illinois 479, 3/Iowa 326, 4/Minnesota 309, 5/Missouri 255, 6/Farm Credit Adm.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

What Is Cheap Land?

True D. Morse

Doane Agricultural Service

PRODUCTIVE farm land in the Corn Belt is again selling readily in a range of $100.00 to $200.00 per acre with some sales being made at $300 per acre or more. There is developing increasing price resistance against paying such high prices per acre. Buyers always want to buy bargains—cheap land in relation to its true value. Cheap land when thus defined may be $200.00 per acre or $15.00 per acre depending upon the adapted use.

What is cheap land? When is land a bargain?

These are questions important not only to buyers but to those who own land. The class of land that is too high-priced to buy may be too high priced to continue to own. Often the best advice you can give a farm owner is to sell the land he has and then buy a better farm. The same facts that indicate what a buyer should purchase also show the kind of land a person can most profitably continue to own.

It is not always easy to convince a man with $32,000.00 to invest in farm land, that he should buy:

160 acres at $200.00 per acre instead of 1600 acres at $20.00 per acre.

Neither is it always easy to convince a farmer that he should:

sell his 800 acres at $25.00 per acre and buy 200 acres at $100.00 per acre;

but these figures illustrate practical problems that come to farm managers and land appraisers almost daily.

WHEN a person has spent hours patiently explaining to a farmer or business man why a farm priced to him at $150.00 per acre may be much cheaper than six times the acreage priced at $25.00 per acre and then sees the man go out and buy the big acreage at the low per acre figure he knows what price resistance is. He also is confronted with one of the reasons why land at a low price per acre is often so high in price in relation to its true value. Because it appears cheap, it often sells high.

Even experienced appraisers and loan men in the past have made similar mistakes. "Poor land is usually appraised too high and good land is valued too low." "Too much is loaned on poor land." There are much statistical data to support such statements. Witness records such as the following that have brought loss to loan companies and bankruptcy and foreclosure to farm owners by the thousands:

Soil Productivity	Appraised Value of Land per Acre	% of Loans Foreclosed.	Net Loss per $1000 Loaned
Good	$207	8	$ 16.10
Intermediate	117	12	45.99
Inferior	83	21	106.29

"Losses to lenders are likely to be heaveier on poor soils than on good soils." (Bulletin 468, University of Ill., Agricultural Experiment Station.)

More debts are paid on farms with good soils even though the debt per acre is much higher. Some studies show as much as 5 to 10 times better records in favor of good soils. The records of typical studies are shown by the accompanying graphs. (The graph showing yields is for Montana Wheat lands.)

The disastrous 15 years following 1920 that wrote such records as the foregoing should have taught a lesson that this generation would never forget. But there is plenty of evidence that many farmers and other farm buyers still do not know what land is cheap and which farms are high priced.

IOWA State College has received the following informative averages on land value trends from real estate dealers in Iowa:

	November 1941	November 1942	% Increase
Excellent Land	$120	$134	11
Good Land	90	101	12
Fair to Poor Land	55	64	16
Average	$ 88	$100	13

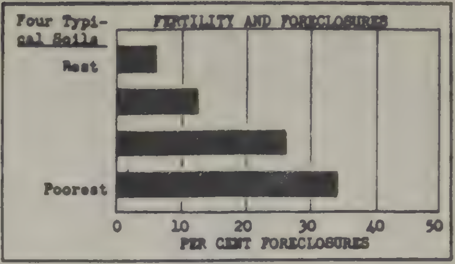
History is repeating itself. Fair to poor land is increasing most rapidly in price. Too much probably is again being paid for poor land in proportion to earning value.

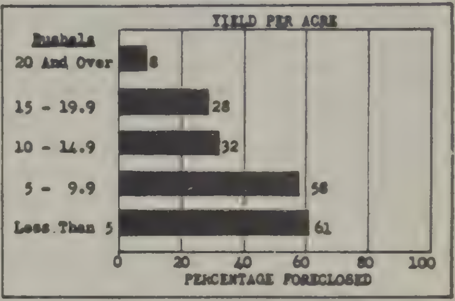
Perhaps most buyers are not statistically minded enough to realize that when

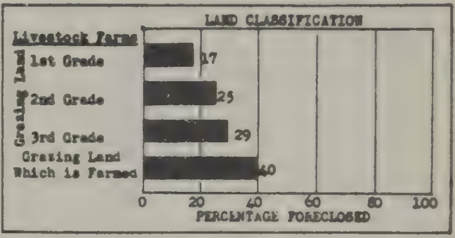
$100.00 land moves up $25.00 per acre in price it is the same percentage increase as,

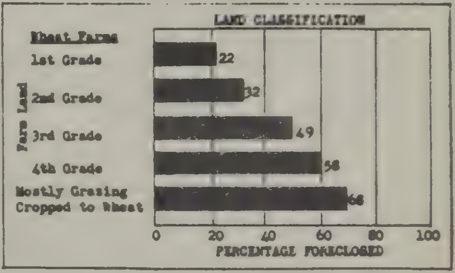
$10.00 land moving up $2.50 per acre.

Right now central Iowa buyers are balking at paying $150 per acre for land priced a few years ago at $100, but they go into areas of poorer land and think they are buying a bargain when they pay $50.00 per acre for farms that a few years ago were going begging at $25.00 per acre.









> LET US never forget that the cultivation of the earth is the most important labor of man. Unstable is the future of a country which has lost its taste for agriculture. If there is one lesson of history that is unmistakable, it is that national strength lies very near the soil.
>
> *—Daniel Webster*

What do farm management records show is cheap land?

In Illinois for 1940 Farm Business Reports on 2,738 of the better managed farms show returns on the total capital investments declined with average per acre values as shown in table on page 8 (U. of Ill.)

It is probable that this record can be duplicated in any state and in any type-of-farming area. Whether producing corn, cotton, wheat, sugar beets, tobacco or cattle or sheep on range land this rule invariably holds true—high yields per acre are associated with prosperity. Land that is most productive—whether the product be corn, cotton, wheat, pasture, or range—usually makes the highest average return on the investment and pays the most to the operator for management and labor.

Unusually capable men may make

What Is Cheap Land?

Area	Value of Land and Improvements per acre	Total Investment per acre	Net Income per acre	Return on Total Investment per acre
4	$133	$169	$9.02	5.3
2	120	163	8.71	5.3
3	116	155	8.01	5.2
1	113	163	8.66	5.3
5	84	112	4.68	4.2
6	62	88	4.34	4.9
8	55	74	3.11	4.2
7	39	57	1.81	3.1
9	35	50	.35	.7

equally good returns on less productive land but the average do not succeed as well. When this same unusual management ability is applied to land of better quality much greater returns are usually produced.

Obviously in comparing the productivity and price of various tracts of land the comparisons must be kept within similar use groups. Corn Belt farms must be compared with other farms best adapted to the growing of Corn Belt crops. Sheep ranches should be compared with other ranches adapted to sheep grazing. Thus $150.00 Corn Belt land may within the Corn Belt be equal to $15.00 per acre sheep ranches. Therefore, these statements must not be inferred as condemning land selling at a small price per acre. If it represents the better lands within the class it may be the most profitable in relation to its price and hence the truly "cheap land."

The accompanying graphs illustrate this fact. First grade lands have suffered the smallest number of foreclosures, whether they are livestock farms or grain farms. (Based on data of Montana State College.)

It is rather drastic treatment for a farmer or farm owner to actually sell a farm and buy another because of price relationships but there are many cases in which this should be done. Successful farmers can well consider selling their low producing farms and buying better lands when there is an active market for low priced land. This is "buying up the ladder" much the same as the capable hired man progressing to a tenant and later becoming a land owner. A word of caution—in uncertain times like these such a change should not be made if excessive debts will result.

Prices of farm lands are going up. They will continue to rise as long as the prices of farm products go up. Prices of farm products will continue to go up for the duration of the war, and many economists anticipate that they will continue to rise or stay at a high level for one to two years after the war ends. Others fear a break in prices as soon as the war stops.

For 1941 the increase in farm real estate prices was the largest in 30 years, except for the 4-year advance stimulated by World War I. Every state reported increases of one to fifteen points, with a 7 percent average rise for the United States as a whole. Such data as is already available for 1942 shows that land price increases are continuing.

Foreclosed and other liquidation lands are rapidly disappearing from the market. Voluntary sales have increased rapidly to the largest number per 1000 farms since 1920.

Local land booms have been in progress for the last two or three years and the stage is all set for a further rise in land prices. Another general land boom of major proportions may be in the making.

It is under such conditions that land of low value becomes disproportionately high. With a less active market such land is slower to sell and under closer study its true value is more apt to be recognized.

Those who will most effectively weather the difficult years following the war will not be those who have loaded up with "cheap land." The margins of income above taxes and other fixed charges can rapidly disappear when prices drop. Those who have purchased at a fair price, good land well adapted to the use being made of it, should have a continuously favorable experience.

"I had seen the security based upon banks, stocks, bonds and industry, waver, disintegrate and vanish. In the 25 years spent in half the countries of the earth, I had seen only one form of security which survived everything. That was the security which comes of the land, of owning good, productive earth."—*Louis Bromfield.*

Land is probably the safest of all investments but—*beware of the lure of "cheap land"—it often is very high priced.*

The foregoing article was written by request based on the need in this period of rising prices, for guidance on the type of farm land which should be purchased. With present high prices of farm products many farms are showing abnormal earnings. Because of this, purchasers who do not fully understand the sources of land values can easily be induced into investing in land that will in times of less price inflation, prove to be a liability rather than an asset. This is especially true for absentee owners who desire primarily an investment.

Those who wish further information should refer to Digest pages such as the following:

Page No.	
1005	Suggestions to Purchasers of Farms
1009	Earnings Value of Land
1057	Credit Risk Factors
1061	Safe Farm Mortgages
313-315	Farm Land Prices
643-644	Acreage of Excellent and Good Land

An accurate calculation of value based on earnings is the acid test to which farms should be submitted when planning either the purchase or continued ownership. In figuring earnings be sure to use the American Rural Appraisal System of average yields, based on typical operation and long-time average prices of farm products. Do not use present prices of farm products to figure the earning value of land.

"The Basic Value of a rural property is its worth derived from earnings under typical operation and from location and other economic and home uses."

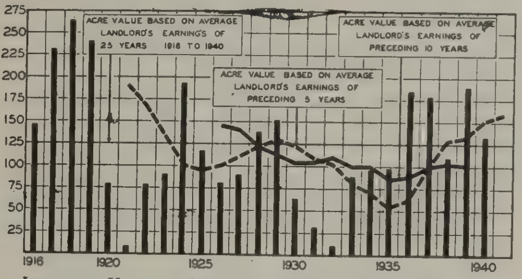
EARNING VALUE OF LAND

EARNED INVESTMENT VALUE OF ILLINOIS CORN-BELT FARMS

During the years 1918 to 1920 many Illinois corn-belt farms sold at figures ranging from $300 to $600 per acre. Loans of as much as $200 and even more were made per acre on combined first and second mortgages. When the agricultural depression of the 1920's and the general depression of the early 1930's came, many of the borrowers lost their farms.

The rent from even the better Illinois farm land will not support a loan of $100 per acre, pay the real estate taxes, and supply the minimum needed to keep up the improvements during a depression. If the family owning the farm is dependent on the farm income for support, foreclosure of the mortgage will come earlier and more certainly.

Rented Land. The studies in Woodford county show that the average land under ordinary tenant management has had a 25-year investment value of about $125 per acre for the land and buildings, including the residence, and a 15-year postwar investment value of about $113 per acre.



Investment Value per Acre of the Average Woodford County Farm Land Based on Landlord's Net Earnings as Shown by Account Records of Rented Farms Kept During the Period of 1916-1940

Studies of landlords' long-time incomes from ordinary corn-belt land, where 35 to 50 percent of the land is kept in corn, show that, within the ordinary ranges of 40 to 50 bushels, the investment value for each bushel-increase in the average acre-yield of corn increases about $4.00.

Many amortized loans run for 25 years or longer. If history repeats itself, the average income producing value of corn-belt land during the life of the ordinary loan will be only about $125 per acre. Any greater value placed on ordinary land must be based on home value, on superior productive capacity of the soil, on superior management of the operator, or on a speculative value.

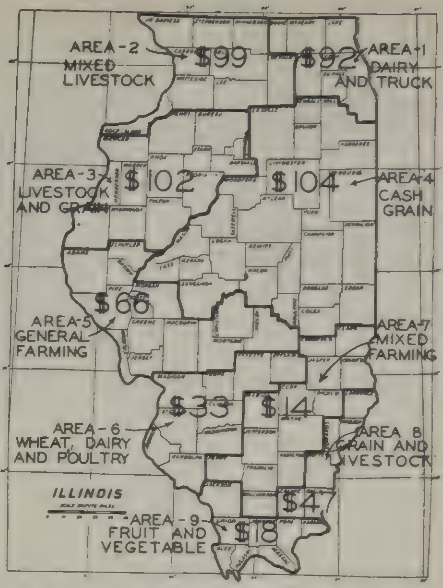
Owner-Operated Land. During the 25 years 1916 to 1940, the Woodford county record-keeping farms that were operated on the owner-operator basis produced an average net income of $10.69 per acre for the land and buildings. If the acre-income of $10.69 is capitalized at 5 percent in order to cover interest and amortization charges, an acre-value of $214 results; if it is capitalized at 6 percent, an acre-value of $178 results. Many people have erroneously considered such a calculation to indicate that the average record-keeping farm has an acre-value of about $200 per acre. However, part of the net income of $10.69 per acre was for management and income from livestock enterprises which required the use of only a small portion of the land. If an owner-operator had $200 an acre invested in his farm and if he should die, the farm would be worth only what it would bring to his family as an investment in the hands of a good tenant.

Earned Values by Type-of-Farming Areas. Table 2 shows the annual earned value of land and buildings and a 15-year average value based on the capitalization of the net cash income less the operator's and family labor at 5 percent in each of eight of the nine type-of-farming areas of the state.

Table 2

Earned Value of Land and Buildings Based on Net Cash Earnings per Acre by Type-of-Farming Areas and by Years

Year	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8
1926	$147	$169	$146	$118	$119	$44	$45	$89
1927	147	110	119	96	35	43	50	75
1928	100	71	99	166	90	5	−27	46
1929	162	147	163	158	104	61	13	57
1930	117	124	120	120	91	27	− 7	36
1931	69	60	43	33	13	2	−18	− 5
1932	54	10	19	9	3	−12	− 9	− 9
1933	55	42	67	45	43	18	14	14
1934	62	94	104	121	83	37	28	55
1935	35	123	96	95	66	47	42	72
1936	121	152	152	173	79	48	37	71
1937	112	109	92	99	70	45	7	63
1938	59	86	103	103	68	33	10	33
1939	30	68	94	107	60	45	7	61
1940	114	122	113	121	59	55	15	40
15-year average earned value	$ 92	$ 99	$102	$104	$ 66	$33	$14	$47



Fifteen-Year Average Earned Value per Acre of Illinois Farm Land in the Nine Type-of-Farming Areas, Based on Net Cash Earnings per Acre on 25,000 Record-Keeping Farms

LAND VALUES IN RELATION TO FARM EARNINGS

Land values prior to 1920 were not closely associated with farm earnings. An average Illinois farm purchased in 1850 and sold in 1920 would have netted, at compound interest rates, a four percent return on the investment without including income or expenses of operation during that period. During the last 20 years of this period the advance in land values averaged ten percent annually in many central Illinois counties.

Except for the war and post-war years of 1917-1920, landlords did not receive a net rent of more than a two to three percent return on the current selling price of land.

With the collapse in land prices which took place following 1920 and the debt problems which followed, we need to give careful thought to future land price trends.

A review of such data is valuable as a warning against letting a short-time rise in prices influence one's judgment of land values. Land must be paid for by the average purchaser from earnings obtained over a long period of years. Land prices, therefore, should be based upon expected earnings over a long period of time. If the present European War should cause higher prices for farm products because of our nearness to Europe as happened during the World War, let us not make the same mistake of bidding the price of land up to a level that cannot be maintained by farm earnings.

What land is worth to the individual farmer finally depends upon two major conditions—his ability as a manager and the way the land has been handled over the past half century or longer.

In general, farmers with higher than average earnings will be the future land buyers among farmers. Because of their superiority as farmers they will be able to pay more for land than the average farmer. The average farmer over a period of years will, on the basis of past experience, make a lower return on the investment than the going rate of interest on farm mortgages. The competition to buy land on the part of the best farmers and city people who have capital to invest tends to set land prices at a higher level than the earnings of the average farmer justify when the debt burden of the average land purchaser is considered.

Frequently the home value of a farm is mentioned indicating that this justifies a higher price for the land. The man who buys a farm expecting to pay for it out of the earnings from farming cannot afford to pay an additional price above the earning value of the land for the home value of a property unless he is able to make larger earnings from the land than would the average farmer. Likewise land has a speculative value when there is possibility of realizing on mineral resources, but land limited to agricultural purposes should be valued on the basis of the future income from farming.

During recent years farmers have received the benefit of a reduction of from one to two percent in the interest rate on farm mortgages. If a marked increase in the prices of farm products should occur for a short period of time, it is to be hoped that land prices will not increase as they did in the period 1917-1920. If lower interest rates should have the effect of helping to raise the price of land so that the farm purchasers would have as much interest to pay on debts annually as they did at the higher interest rates it would be detrimental to farmers generally.

Finally, if there should be a decided upward trend in farm earnings for a short time growing out of the European war, it should be remembered that the only people who profit from high land values are those who sell the land and do not re-invest the proceeds in more land at equally high prices, or those who are paid for their services in helping to sell land. The average purchaser who pays a higher price for land must assume a larger debt and often finds it necessary to accept a lower standard of living for his family because of his debt load.

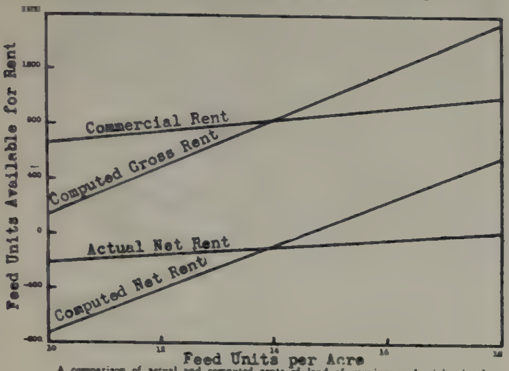
Illinois Farm Economics Number 73
University of Illinois
Selected Statements with Omissions Indicated by Dots

ABILITY OF FARM UNITS TO PRODUCE RENT

The ability of a farm to pay rent depends primarily on two factors:

1. Size of the unit, and
2. Productivity level.

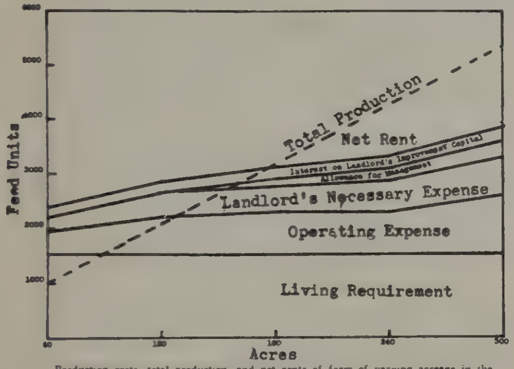
Rent terms in a given community tend to be rather fixed regardless of the size or productivity of the land.



A comparison of actual and computed rents of land of varying productivity in the Big Creek Watershed.

When rents are calculated on the basis of the ability of the land to pay it is found that operators on poor farms pay more rent than the land will justify and, hence, either depleat their working capital, lower their standard of living, or develop some source of outside income. On the highly productive land, however, operators pay less rent than the earnings ability of the land would justify and are able either to accumulate working capital, raise their standard of living, or make outside investments.

The size of the farm has a direct bearing on the ability of a farm to pay rent. On the average farm in the Big Creek Watershed (part of Harrison County, Missouri and part of Decatur and Ringgold Counties, Iowa) it requires all of the crops produced from 90 acres to maintain a minimum standard of living. It takes 126 acres to provide a living and meet the tenant cash operating costs. It is not until these costs have been met that commercial rents are justified. Even then it takes all of the production from another 29 acres to meet the landlord's direct costs and a total of 174 acres is needed to meet all costs including interest on owner's investments.

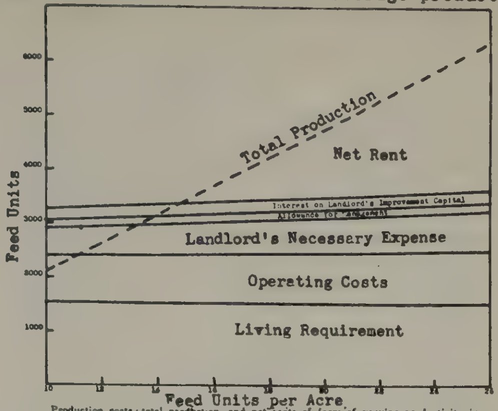


Production costs, total production, and net rents of farm of varying acreage in the Big Creek Watershed.

In Nodaway County the soil productivity is much higher and a farm of 80 acres will produce sufficient feed units to justify a commercial rent because it more than supplies the minimum standard of living plus tenant's operating cost. It requires an average farm of only 105 acres to produce a net rent.

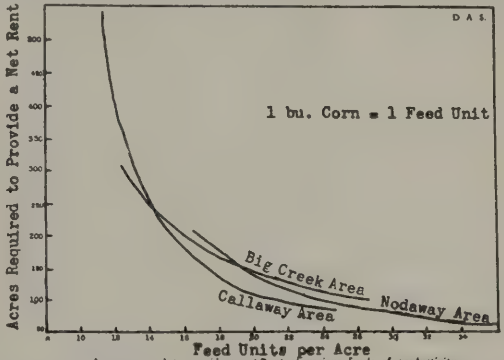
Callaway County soils are lower in productivity and it takes approximately 100 acres to support a minimum standard of living and 126 acres to justify a commercial rent. In this area approximately 180 acres are necessary to produce a net rent.

When considered from a soil productivity standpoint the average Big Creek farm of 228 acres will not produce a net rent unless it has an average productivity of about 15 feed units per acre. An average productivity of at least 11 feed units per acre is required to justify a commercial rent.



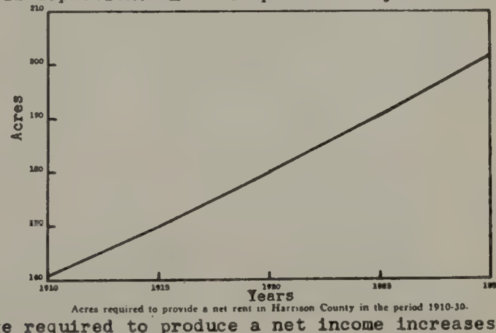
Production costs, total production, and net rents of farm of varying productivity in the Big Creek Watershed.

Within certain limits increasing the farm acreage will compensate for the lack of high productivity. If productivity drops low enough, however, the addition of an unlimited acreage will not enable the land to produce a net rent. In fact, adding acreage would then only increase the loss, as the larger the size the further below the rent margin the farm unit would fall.



Acres required to provide a net rent at various levels of productivity

Net rent as used here should not be interpreted as "economic" rent because it does not include an allowance for soil depletion. As soil productivity declines the acreage required to produce a net income increases.



Acres required to provide a net rent in Harrison County in the period 1910-30.

Land has earning value only as it is able to produce a net rent, and a farm is cheap or expensive in direct relationship to its ability to pay rent. Careful consideration should be given to the interrelation of size, productivity, and the declining soil fertility level in the purchase and appraisal of farms to avoid overvaluing small or low-producing farms and undervaluing large or highly productive farms.

Data from & Statements based on Bul. 308, U. of Mo.

The American Rural Appraisal System, the principles and practices of which are herein outlined, constitutes acceptable appraisal practices. (It is recognized that there are various acceptable methods of applying these principles in the practice of Rural Appraising.)

Cardinal Principles

Appraised value is determined by:

(a) Income capitalization

(b) Comparison

(c) Reproduction cost, indirect influence of

Income capitalization is a direct and primary approach.

Comparison is an indirect but equally important approach.

The use of both the income capitalization and comparative approaches to value is necessary in every appraisal, and one should not be emphasized to the minimization or exclusion of the other.

Reproduction cost is useful primarily in reporting and analyzing the value of improvements.

Basic Value is derived by the standard application of the foregoing principles and is determined in making every appraisal regardless of the purpose of the appraisal.

Various kinds of value, or value for different purposes, are dealt with as departures from basic value.

Appraisal reports are comprised of three methods of presentation, *i.e.*,

(a) Mathematical calculations and analysis

(b) Descriptive or narrative statements of facts and their interpretation

(c) Graphic or pictorial presentations.

Every appraisal report covering rural real estate must make use of all three methods of reporting and interpreting facts.

Procedure

A practical procedure and logical sequence in making appraisals according to the American System is briefly as follows:

Inspection of the Property

A thorough personal inspection must be made of the property under conditions favorable to a complete observation of the entire property and an accumulation of all essential facts about same.

Maps

A general map should always be made as a result of the inspection of the property. It need not have the accuracy of a survey, but should be drawn to a definite scale and should show the following:

1. A complete and accurate legal description
2. An outline of the property
3. Location of important topographic and natural physical features, such as streams, ditches, and timber
4. Location of improvements such as buildings, fences, and roads
5. Field layout and land use map
6. Legend to facilitate identification.

Special maps such as those showing soils are frequently used.

The maps are the most important graphic or pictorial presentations enabling readers of the appraisal report to visualize the property.

Appraisal Report

The data gathered in the field are organized and written into a comprehensive report. Facts are recorded and then interpreted both by statements and by value figures.

The document should show:

(a) Date of the appraisal

(b) Description of property

(c) Basis of valuation

(d) Supporting data and analyses

(e) Conclusions

(f) Limiting conditions, if any

(g) Signature and/or certification of the appraiser.

The narrative part of the appraisal report is the descriptive or word picture of the property in which all of the valuation elements are discussed.

Reproduction Cost

Buildings and other comparable improvements are appraised on the basis of reproduction cost less observed depreciation. Obsolescence is frequently a major item of depreciation. Such appraisals of fractional parts of the property are used primarily as factual information supporting the income capitalization values and the comparative adjustments.

Income Capitalization

The income capitalization approach to value is the determination and capitalization of the annual net money income. It is based on the monetary returns that may reasonably be anticipated from the future operation of the property.

Method

The gross income is estimated, and from this expenses are deducted.

Typical operation and management is assumed.

The net income is then capitalized to obtain the property value based on income or earnings.

The calculation of net income on a rental basis simplifies the process and is conducive to accuracy.

Comparative Approach

Valuation by comparison is the establishment of property value according to the known or recognized value of other comparable property or factors and elements of properties.

Method

Since this approach, if used independent of the income capitalization method, would of necessity include the income value, it is expedient to use the comparative approach as a basis of adjusting the income capitalization value. (Some appraisers reverse this procedure and use the income capitalization value as a check.)

The basis of comparison is actual and not typical.

It is based on a complete assembly of all factual data in regard to the property factor or element under consideration and its comparison with other properties, factors or elements.

JOURNAL of the American Society of Farm Managers and Rural Appraisers

The adjustment figures arrived at by comparison show only the value influences not already reflected in the income capitalization value.

In making comparative adjustments, both economic and home use factors should have consideration. Important factors under each are:

Economic Use—Location and Physical Factors.

1. Roads and transportation
2. Marketing facilities
3. Outside employment possibilities
4. Community factors affecting income
5. Nuisances
6. Hazards
7. Improvements
8. Natural resources
9. Physical features.

Home Uses—Aesthetic.

1. The home—house
2. Yard—landscaping
3. Recreational and scenic
4. Church and school
5. Neighbors and neighborhood.

Basic Value

Basic value results from the adjusted income capitalization value.

Kinds of Value

Where appraisers are called upon to determine and report special kinds of value, Basic Value should first be determined and shown in the appraisal. The special value should then be set out together with a clear statement of the kind of value it is and the basis for determining it.

General

The calculations used in figuring the income capitalization value and making the comparative adjustments, as well as all other numerical data used in determining Basic Value, and where required, special values are the mathematical picture or presentation of the appraisal.

Certificate

Every appraisal report should be accompanied by an appraisal certificate signed by the appraiser, which should be prominently placed and permanently attached to the report.

The certificate should show:

(a) The number of pages in the report
(b) Identification of the property appraised
(c) Date and basic and other value set as of that date
(d) A statement showing the interest, if any, which the appraiser may have in the property.*

Appraisal Definitions

The following definitions are applicable to the practice of appraising and are not offered as technically correct.

1. *Rural Appraisal.* A rural appraisal is the definite, written, detailed opinion of a qualified appraiser as to the value of a rural property.

2. *Qualified Appraiser.* A qualified rural appraiser is one who, by education and experience, has fitted himself to pass dependable judgments upon the value of rural properties. An organization of qualified individuals may make appraisals in the name of the organization.

3. *Rural Property.* Rural property is either real estate or personal property which has value for agricultural or related uses.

4. *Rural Real Estate.* Rural real estate is agricultural and other non-urban land with all its fixed improvements, riparian and water rights, and natural resources such as minerals and timber.

5. *Improvements.* Improvements of rural real estate consist of those items which are conveyed with the land as real estate.

(Note) — Items ordinarily considered as improvements include — Buildings, Tiling systems, Fences, Windmills, Perennial fruits, Permanent water and Electric systems.

Controversial items which ordinarily are not considered as improvements include—Feed mills, Detached grain elevators, Movable water troughs, Unattached wire and posts, Movable chicken and hog houses.

6. *Detriment.* A detriment is that which continually or permanently injures, reduces in value, or causes measurable damage to crops or property.

7. *Hazard.* A hazard is that which causes loss or damage to a property or its products, recurring at irregular intervals, with sufficient intensity to destroy a substantial portion of the value.

(Note)—Consideration should be given to those hazards which are known to exist in the community, even though tangible evidence of their existence is not apparent on a given property.

8. *Earnings.* Earnings are that portion of total income resulting from typical use of a property which is assigned as payment for its use

9. *Income.* Income is increase in wealth measured in terms of money, accruing or received during a given period.

10. *Net Money Income* is the net rent under a lease-hold or the net operating income in case of an owner-operated farm.

11. *Capitalization* is the process of determining present value of future net money income.

12. *Rate of Capitalization* is the ratio of net annual money income to the capitalized money value. Capitalized value is computed by dividing annual net money income by the selected rate of capitalization.

13. *Typical.* Typical is that which most frequently exists, or occurs, in the particular situation under consideration.

14. *Basic Value.* The basic value of a rural property is its worth derived from earnings under typical operation and from location and other economic and home uses.

Kinds of Value (Partial List)

15. *Present Market Value.* Present market value is the price at which within a reasonable time and with a substantial down payment, the property may be expected to change hands from a willing, able and informed seller to a desirous, able, and informed purchaser.

16. *Forced Sale Value.* Forced sale value is the price for which the property can be sold within a restricted period of time for cash

(Note)—This value emphasizes (1) salability of the property, (2) prevailing condition of the real estate market, (3) current earnings. This definition assumes also to cover "liquidation value" and "cash value."

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*For Code of Ethics see Page 546.

RURAL APPRAISAL FIELD PROCEDURE

EFFICIENCY, UNIFORMITY, AND ACCURACY IN APPRAISAL PRACTICE WILL RESULT FROM ADHERENCE TO A SYSTEMATIC PROCEDURE SUCH AS IS HEREIN OUTLINED. THESE METHODS ASSUME USE OF THE AMERICAN RURAL APPRAISAL SYSTEM AS OUTLINED IN THE RURAL APPRAISAL STANDARDS OF THE AMERICAN SOCIETY OF FARM MANAGERS AND RURAL APPRAISERS.

PRELIMINARY PREPARATION

As soon as an appraiser receives an appraisal assignment and before starting on the field inspection he can expedite his work by proceeding as follows:

1. The appraisal assignment and all supporting information should be studied, and if, from the appraiser's knowledge of the territory, it appears doubtful that the property will meet the specifications of the client, the appraiser should request further information or instructions before incurring the cost of the appraisal. This procedure frequently will avoid needless expense.

2. When certain that the appraisal is to be made, fill in on the appraisal blank such items as the following:

(a) Name of client, name and number (if any) of property, addresses, and any other details that can as easily be completed in advance as after the field inspection.

(b) Accurate legal description using abbreviations and form as follows:

NW$\frac{1}{4}$ Sec 2) T42 N, R 23 W
N$\frac{1}{2}$ of NW$\frac{1}{4}$ of SW$\frac{1}{4}$ Sec 2)
SW$\frac{1}{4}$ Sec 35, T 43 N, R 23 W except a tract beginning at the NE corner thereof, and running thence S 1.05 chs. thence W 10o S 32.50 chs. thence N 1.05 chs. thence E 10o N 32.50 chs. to the point of beginning.

If, after the appraisal is completed, the accuracy of the description is in question, add to the legal description an explanation in parenthesis or insert, "see note attached", and write a full explanation on a separate sheet.

(c) Many other items such as average county rating of soils, county average crops yields, and type-of-farming area of state and county. Location details can also be inserted if county plats are available.

3. On a separate plat sketch the following if available:

(a) Soils as shown by the county soil map.

(b) Location of schools, churches, roads, railroads, streams, ditches, etc. from county plats and from soil maps.

(c) Copy of aerial photograph. Use a photo of known scale. Possible sources: A.A.A. offices, owner or tenant, S.C.S. office, other public or private sources.

(d) Facts from any other surveys or maps of the farm or area that have usable information.

Scaled photos of the farm can usually be relied upon for details but the other sources are usually not accurate as to the details of the individual farm. They are helpful as general guides. Do not depend on any of them. Everything should be verified before it is entered on the final plat or inserted in the finished report.

Helpful plats can often be located in abstract and real estate offices, banks, government offices, offices of oil and mineral companies, and sometimes even in country stores or other commercial establishments.

4. If it is known that the county seat may not be included in the inspection trip, send a letter at once to the proper county officer, usually the collector or treasurer, asking for the following tax information:

(a) Assessed valuation for a 5-year period.

(b) Tax for present and preceding 5 years.

(c) Amount of delinquent taxes by years.

(d) Any special or drainage taxes. (Ask specifically for these)

Show in the letter the legal description and name of landowner. Enclose a stamped and addressed envelope for reply.

5. From the time the appraisal assignment is received, the appraiser should be on the alert to gather all possible facts in regard to the property. Determine the history of the farm, the kind of community, local reputation of the farm and the way it has been used, abused, or improved. An appraiser can often pick up general information from assessors, collectors, neighbors, and others well acquainted with the community or property that will be of real value to him.

Do not overlook any possible source of information.

6. Recheck the Appraiser's Handbook for the state to assemble all of the data that apply to the county in which the land is located. Statistics are more important than opinions.

Review the characteristics of the main soil series that are likely to be encountered.

Restudy the DOANE AGRICULTURAL DIGEST data for the broad background of the area in which the property is located.

7. An appraiser should maintain a reference library containing all available pertinent data for the areas in which he undertakes to set valuations. To undertake to make appraisals without a working library of statistics and other data is as ridiculous as a lawyer trying to practice law without a law library. An appraiser should make full use of his library both before and after his field inspections.

FIELD INSPECTION

Work from the general to the specific. This process has already been started by the preliminary preparation.

1. Make a tracing of the aerial photo before going to the farm. Usually this means a trip to the county seat. This is the opportune time to check the county records, get tax data, and work out problems relative to the legal description. The county agent, real estate men and others familiar with conditions in the county should be interviewed at this time.

2. If there are two routes to the farm, approach by the most frequently used roads. After completing the inspection leave by the alternate route.

3. After reaching the farm and observing its general setting, make a complete inspection of the community before going onto the farm. This involves driving all neighboring roads and is usually accomplished by circling the farm with a trip of 8 to 12 miles.

Regardless of the familiarity of the appraiser with the community he should never fail to make this community inspection. He now has a valuation assignment in this specific location and all community features take on a new meaning.

In making the community inspection much of the information necessary for accurately setting up typical operation for the property will be obtained. On the accuracy of the community observations and analysis will largely depend the accurate handling of the comparative part of the appraisal, that is, the adjustments

4. When going on the property make only general observations of the buildings and proceed with the detailed mapping and inspection of the land. When the appraiser returns to the buildings he can study them and take the detailed measurements and descriptions, having in mind the type of farm on which the buildings are located. He will thus study the improvements from the standpoint of their adaptation to the property.

DOANE AGRICULTURAL DIGEST Revised FEB., 1947
This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

RURAL APPRAISAL FIELD PROCEDURE

5. Systematically inspect the farm. Start at a known location and follow a route over the farm that enables all of the land to be observed. On most farms this means following a line of travel about 20 to 40 rods in from the boundary line and crossing each 40 acres an average of about twice during the inspection. Use the air photo tracing as a base map if it is to scale. Check details while on the farm because most aerial photos were made several years ago and many things could have changed.

Walk. Do not ride over the property unless it is a ranch or other large acreage of uniform or very low-value land.

6. Many of the notes taken during the field inspection can best be made on the blank in the margin of the space in which the information eventually will be written into the report. Facts such as building descriptions can be written into the blank ready for final typing at the time of inspection.

7. Before leaving the farm recheck the entire appraisal blank to be certain that all essential facts have been recorded.

8. The property history and production record of the farm can best be obtained from the operator after the farm inspection. The appraiser is then able to intelligently discuss the farm with the operator and should ask for specific information about certain fields, soils, drainage problems, etc. that otherwise would be overlooked. Do not fail to develop fully all facts regarding tile.

9. The field trip is not complete until the appraiser has obtained from neighbors, local merchants, truck operators, elevator and gin records, and other local sources sufficient information to verify the productive ability and other characteristics of the farm and community. These sources will also give the reputation of the farm in the community and many other important facts.

10. Do not give the occupant of the farm or others in the community information about the value of the farm, the buildings, or any other facts that your inspection reveals. The appraiser is working with a confidential assignment and he must not reveal the information which his work enables him to obtain.

PLATS-Observation of the following will make for uniformity and accuracy in completing plats:

1. In all cases except large ranches, timber tracts, or other extensive property use a scale of eight inches to the mile--on this scale, 1 square inch as marked off by the dots equals 10 acres. If the use of this scale does not permit the entire map to be placed on one sheet use large plats or paste small ones together.

2. Do not locate two tracts on the same plat unless they are accurately located in relation to each other. If placed on separate sheets a small diagrammatic map may be used to show the relationship of the two tracts and how they are connected by road.

3. Make maps to scale irrespective of guide lines and dots so as to accurately show irregularities and over- and underruns.

4. In starting the plat in the field it is necessary, for accuracy, to start at a definite known location.

5. If the car is equipped with a rod meter the roads can be driven before going on the property to establish fences, ditches and other features that come out to the road. Sufficient pacing should be used to locate accurately all important features such as buildings, fences, streams, main ditches, and timber and soil lines.

6. Adhere to the standard symbols. If any other symbols are used be certain to enter these in the list of symbols.

7. Make the map symbols small and neat.

8. Keep roads and ditches and all other features to approximate scale.

9. Extend roads, streams, and ditches only a short distance beyond the boundary of the farm, usually about $\frac{1}{4}$ to $\frac{1}{2}$ inch. If main highways or towns are close enough to the farm to be shown on the plat it is permissible in most cases to extend the road to connect with such important features.

10. Streams and drainageways not crossable with heavy machines should be shown with double lines. A stream is considered "permanent" (i.e., a permanent source of water)if it supplies sufficient water for livestock most of the year even though only in water holes at times.

11. Before starting to map the soils the lines of the base map should be established for the area on which the soil mapping is to start. By thus having the base lines as guides the soil lines can be drawn with a much higher degree of accuracy then would otherwise be possible.

12. On the final soil plat show only divisions between soil types and the number or abbreviations to identify the soil. Do not show streams, roads, buildings, or other details shown in this general plat. If soil samples are taken and held or tests reported, show locations on the soil plat by numbers in parenthesis.

13. Complete the map as soon after the field inspection as possible while details of the property are clearly in mind.

14. If the appraisal is to be typed, make the final and complete map on a fresh plat. Do not write on this sheet as it can be used for the typed copy. Be sure that the plat is exactly as it is to be reproduced if other copies will be made in the office.

APPRAISAL REPORT

1. The plats should be completed first. There is normally repeated reference to them while writing the report.

2. In writing the report start at the beginning and complete each item in the order listed. Blanks are so arranged that there is a logical and systematic development starting from the first and continuing until the last valuation figure has been entered.

3. Fill in all blanks.

4. Use simple words and statements. Brief, well organized, definite and complete sentences are best.

5. Be specific. Do not generalize. Avoid such words as fair, good, about, frequent, etc. Tell how good and how frequent.

6. Use a slide rule, or calculation tables or machines when possible. Recheck all figures entered.

7. Show three dimensions on all main buildings so they can be cubed for checking the valuations.

8. There is no excuse for not reporting all important facts. Opinions may differ as to the effect of the facts, but bare facts are not a matter of opinion.

9. Before making a comparative adjustment weigh carefully whether the value influence under consideration has already been adequately reflected in earnings or in some previous adjustment figure.

10. In setting comparative adjustments think in terms of both the per acre amount and the total effect, i.e., a $5.00 per acre adjustment on an 80 acre farm is $400.00, while on a 300-acre farm it totals $1500.00.

11. In writing conclusions do not introduce new facts, merely draw the conclusions from the facts already stated.

12. Show the acreage in public roads as a separate item or in with other odd acreages, as: public roads 2.5 acres, drainage ditch 4 acres, and waste 1.5 acres - total 8 acres.

13. Total figures (except acreage)should usually be rounded off.

14. Special taxes always require full investigation. Be sure to gather and report all the facts.

15. At the conclusion of the report give any limiting factors that might affect the completeness or accuracy of the appraisal, such as frozen soil, snow, excessively wet or dry conditions. Of course an appraisal should not be completed if there are conditions that prevent the appraiser from doing accurate work.

16. Complete the appraisal as soon after the field inspection as possible. More accurate reports can be made while the details are fresh in mind and before other work intervenes.

17. Remember that the appraiser must sign the appraisal. It is his work and there can be no alibis. Upon its accuracy in all statements of facts as well as in matters of opinion, including final values, depends the future reputation and standing of the appraiser. Therefore do not release the appraisal until satisfied with it in every respect.

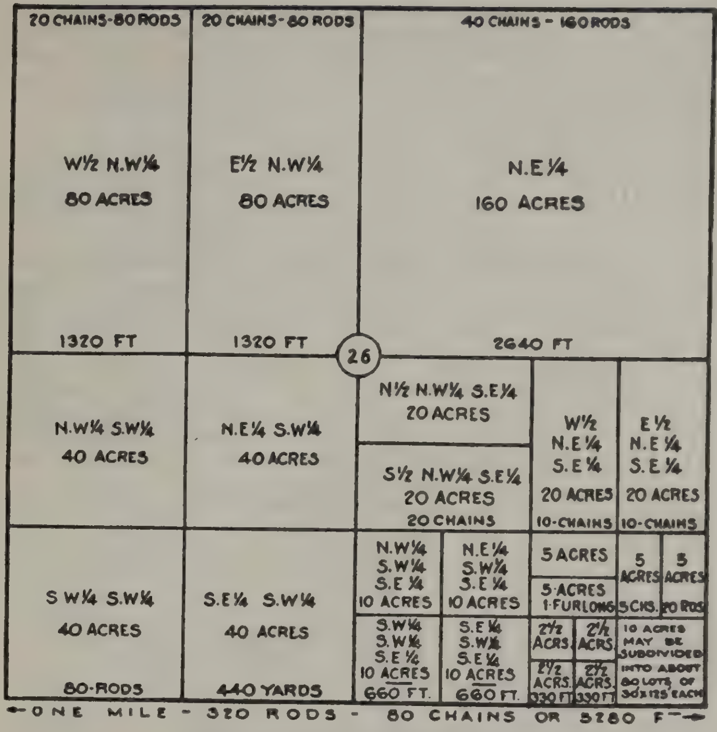
18. If not satisfied with the final results secure the assistance of other competent appraisers even to the extent of obtaining a complete independent appraisal.

The valuation of real estate is serious business. Do not deal with it lightly.

The DOANE RURAL APPRAISAL HANDBOOK is a guide designed for appraisers using the American Rural Appraisal System. This loose-leaf book contains illustrated farm and ranch appraisal forms and outlines the detailed procedure followed by the appraiser in completing the appraisal. Price $10.00 per copy.

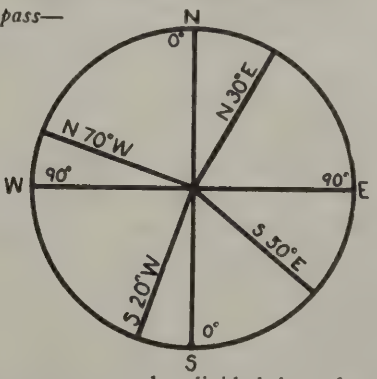
LAND DESCRIPTION AND SURVEY

MAP OF A SECTION OF LAND SHOWING AREA AND DISTANCES.
A SECTION OF LAND CONTAINS 1 SQUARE MILE OR 640 ACRES.



Courtesy of Chicago Real Estate Index Co.

Use of the Compass—



The compass may be divided into four quadrants, each of which is graduated from zero to 90°. North and south are always zero points, east and west are always marked 90. On this type of compass a bearing 30° east of north is read N. 30° E. (not 30° N. E., or N. E. 30°). A bearing of 50 degrees in the southeast quadrant would be read S. 50° E.; a bearing of 20 degrees in the southwest quadrant, S. 20° W.; a bearing to 70 degrees in the northwest quadrant, N. 70° W.

Pacing Distances—

The purpose of pacing is to measure the distance between two points. The natural pace is one step, and each step is counted. In pacing one should walk at a natural gait as if not pacing at all. It is not necessary to take steps three feet apart.

To determine the length of your natural pace, measure off a given distance on level ground. Walk this distance several times both ways at your natural gait. (Start out with your right foot, and count each time your right foot comes to the ground.) Count the number of paces each time. Divide the average number of paces into the measured distance.

Extension Service, Michigan State College

SURVEYORS' MEASURE

7.92 inches..............................1 link
25 links..............................1 rod
4 rods..............................1 chain
10 sq. chains or 160 sq. rods............1 acre
640 acres..............................1 sq. mile
36 sq. miles (6 miles sq.)...........1 township

Inches	Feet	Yards	Rods [1]	Furlongs	Miles
12	1				
36	3	1			
198	16½	5½	1		
7,920	660	220	40	1	
63,360	5,280	1,760	320	8	1

[1] Rod or perch or pole

Inches	Feet	Yards	Rods [1]	Roods	Acres	Miles
144	1					
1,296	9	1				
	272¼	30¼	1			
	10,890	1,210	40	1		
	43,560	4,840	160	4	1	
				2,560	640	1

[1] Perch or square rods.

1-Link is 7.92 inches.
1-Foot is 12 inches.
1-Yard is 3 feet or 36 inches.
1-Rod is 16½ feet, 5½ yards or 25 links.
1-Chain is 66 feet or 4 rods or 100 links.
1-Furlong is 660 feet or 40 rods.
1-Mile is 8 furlongs, 320 rods, 80 chains or 5,280 feet.
1-Square Rod is 272¼ square feet or 30¼ square yards.
1-Acre contains 43,560 square feet.
1-Acre contains 160 square rods.
1-Acre is about 8 rods by 20 rods long, or any two numbers (of rods) whose product is 160.
1-Acre may be divided into about 8 lots 30x125 feet.

1 Vara is 33 1/3 inches.
.36 Varas is 1 foot.
1.08 Varas equal 1 yard.
5.94 Varas equal 1 pole.
23.76 Varas equal 1 chain.
1900.8 Varas equal 1 mile.

5½ Yards equal 1 pole.
16½ Feet equal 1 pole.
66 Feet equal 1 surveyor's chain.
7.92 Inches equal 1 link.
100 Links equal 1 chain.
4 Poles equal 1 chain.
25 Links equal 1 pole.
320 Poles equal 1 mile.
1760 Yards equal 1 mile.
5280 Feet equal 1 mile.

160 Square rods equal 1 acre.
4840 Square yards equal 1 acre.
43560 Square feet equal 1 acre.
5645.37 Square Varas equal 1 acre.
70x70 Yards (practically) equal 1 acre.
210x210 Feet (practically) equal 1 acre.

640 Acres equal 1 section.
4428.4 Acres equal 1 league.
177.2 Acres equal 1 labor.

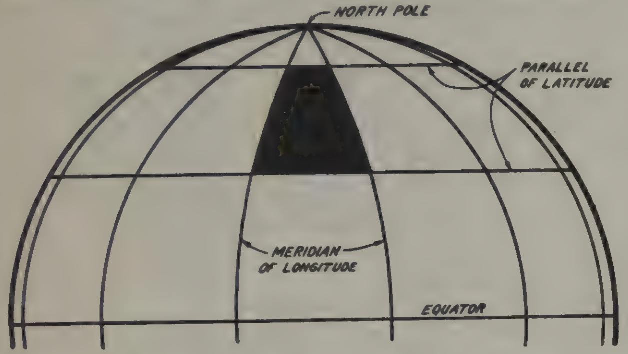
A practical method to reduce varas to poles is to add one for each 100 varas, or 50 per cent. excess and divide by 6. For example: 363 varas plus 3 equals 366, divided by 6 equals 61 poles.

To find the number of acres in any number of square varas multiply by 177 and point off six decimals, or divide by 5646.

To reduce Varas to Yards, divide by 1.08 Yards; to Varas, multiply by 1.08; Varas to Feet, divide by .36; Feet to Varas, multiply by .36.

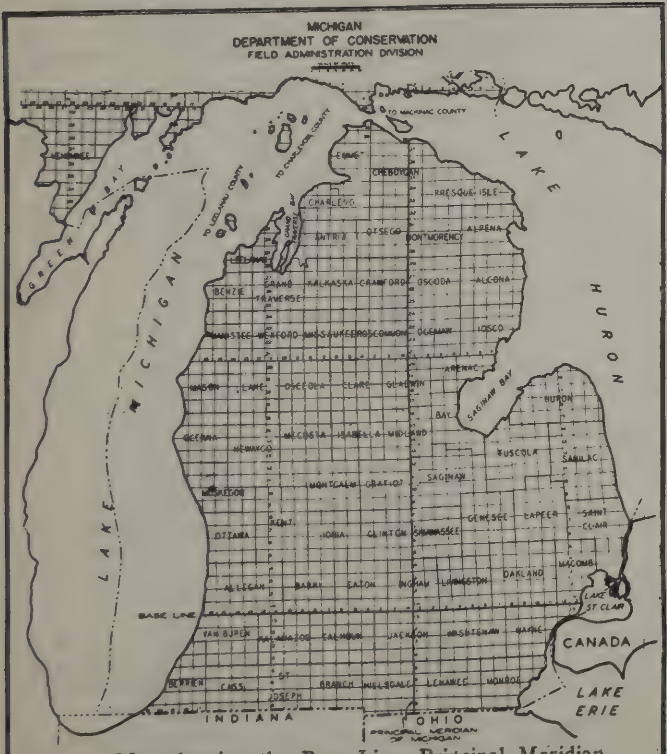
THE SYSTEM OF LAND SURVEY AND DESCRIPTION

The United States system of surveying public lands requires that they "shall be divided by north and south lines run according to the true meridian, and by others crossing them at right angles so as to form townships six miles square." Also, that the townships shall be subdivided into 36 sections, each of which shall contain 640 acres, as nearly as may be. Since the meridians meet at the poles, it is evident that if the requirement that the lines shall conform to the true meridian be fulfilled that it will be mathematically impossible to make each township exactly six miles square. . On an average the north side of a township is theoretically about 73 links or 47½ feet shorter than the south side. In order to conform as nearly as practical to the purpose of the law and to make its application both uniform and effective, an elaborate system of subdivision has been worked out.



Illustrating the meeting of the meridians at the North Pole.

Briefly stated, the subdivision work is conducted as follows: First a point is selected from which to start the survey. This is called the Initial Point. From this point a line is run east and west which is called the Base Line and another line run north and south which is called the Michigan Principal Meridian.

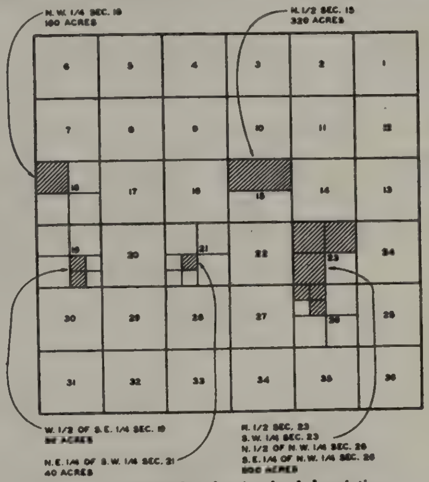


Map showing the Base Line, Principal Meridian and the numbering of the Townships — Michigan

Method of Designating Townships—Those geographical townships located north or south of the base line are known as "townships," or more commonly as "towns." Those east and west of the principal meridian are called "ranges". The townships are numbered in order, to both the north and south, beginning with No. 1 at the base line; and also to the east and west beginning with No. 1 at the principal meridian. A township is designed, therefore, by its serial number north or south of the base line followed by its number east or west of the principal meridian, as Town 48 North, Range 8 West. When writing, this is usually shortened to T48N-R8W.

The foregoing townships are geographical townships and should not be confused with political townships. A political township may be much larger than a geographical township or may include only part of the geographical township. Some political townships may be made up of as many as 10 to 15 geographical townships.

Subdivision of a Township—Townships are sub-divided into sections in such a manner that all shortages due to the meeting of the meridians at the North Pole and some of the errors that might be made in surveying the sections would be thrown to the north and west side of the township. Theoretically all sections except those on the north and west side of the township should be one mile square and contain exactly 640 acres. Actually very few sections are perfect and because of the procedure necessary to follow in surveying each section, it will be found that the east and west sides of the sections are generally 80 chains long, but the north and south sides may be either short or long.



Township plat showing land descriptions.

Subdivision of a Section— To locate the lines of a "quarter" the establishment of the quarter-section corner in the center of the section is required. This corner is necessary for the further subdivision of the "quarter" into "eighties", "forties" and other subdivisions.

The quarter-section corner in the center of a section is always to be located at the intersection of straight lines joining the quarter-section corners on the opposite sides of the section. This method is effective no matter where the section is located within the township, that is, those short sections on the north and west side of the township. This rule would still be followed even though some error was made in the original survey and the quarter corner on the section line was not located in its correct position.

Fractional Sections—In sections made fractional by rivers, lakes, or other bodies of water, lots are formed bordering on the body of the water and numbered consecutively through the section. The boundaries of these lots usually follow the land lines of the section and contain as nearly as may be 40 acres each. Also the quarter-section along the north and west boundaries of a township, into which the discrepancies of measurements or the deficiencies due to convergence of the range lines are to be carried when the sections are subdivided, are usually numbered and sold as lots. These lot lines are not usually run in the field, but like the quarter-section lines are merely indicated on the plats and the areas by which the lots are sold are computed in the office.

THE AMERICAN RURAL APPRAISAL SYSTEM

By True D. Morse, A.F.M., A.R.A.

TWO years ago I presented what was then a relatively new approach to rural appraising.

The intervening years have been crowded with intensive use and study of the system by large numbers of rural appraisers both in this country and in Canada. This use and study have brought about considerable refinement but in no way has it changed the fundamental principles.

The testing and aging process which has been taking place has greatly increased the conviction that we are headed in the right direction. Companies making large use of appraisals are continuing to change over, which is definite evidence of the growing confidence of the public in this appraisal method.

It appears that at last an "appraisal system" has definitely emerged from the maze of property inspection practices which in the past have been dignified with the term appraising. We are now building an organized, constructive method of seeking out rural property values that can, on merit, claim public confidence.

NAME

The new system has been appropriately named the *American Rural Appraisal System.* In so far as we know, this is the first *method,* or *system,* of rural appraising used in this country which makes a definite, logical, step-by-step, systematic build-up, or approach, to a final valuation figure. The use of the term "system" in the name is therefore expedient. This is truly a distinction, and this fact alone should command respect and confidence. The system had its inception in this country through a nationally composed group which included representatives from the insurance company conferences, the Farm Credit Administration, the American Farm Economic Association, the leading farm organizations, and other interested groups. Early in its development, the theory of the system came to the attention of Canadian appraisers who have since been equally as vigorous as the appraisers of this country in the use, study, and development of this method of land valuation.

We are gradually awakening to the realization that fundamental principles of appraising have broad application. They flow through both urban and rural valuation processes and are used in the appraising of all kinds of real estate. In recognition of this fact there recently has been a restatement of the principles upon which the present rural valuation processes have been built.[1]

Editor's Note: Articles by Mr. Morse which deal with the principles of the American Rural Appraisal System have appeared in the following issues of the Journal:

"The Influence of Special Assessments on Farm Values," July, 1935.

"Estimating the Value of Farm Lands," April, 1936.

"Data Program for Appraisal of Dairy Farms," January, 1937.

"The Gyroscope of Rural Appraisals," July, 1937.

"Ranch Appraising," October, 1937.

This restatement uses terminology familiar to urban appraisers. There is no reason why rural and urban appraisers should not write and talk in the same terms when discussing fundamental principles of valuation.

These are the three basic approaches to value estimates. When analyzed, other methods proposed from time to time under various names prove to be one of these three or confused statements of one or more of these basic approaches.

CARDINAL PRINCIPLES

Appraisal value is determined by:

1. Income capitalization.
2. Comparison.
3. Reproduction cost (indirect influence of).

INCOME CAPITALIZATION

Income capitalization is the direct and primary method to appraisal value and one that lends itself to exhaustive mathematical analysis. Because of the fact that it can be developed to such a large extent from definite mathematical data and formulas, it has appeared logical to use it as the foundation on which to build.

The income capitalization approach to value is the determination and capitalization of the annual net money income. It is based upon the monetary returns that may reasonably be anticipated from the future operation of the property.

The gross income is estimated, and, from this, expenses are deducted. Typical operation and management are assumed. The net income is then capitalized to obtain the property value based upon income or earnings.

The calculation of net income upon a rental basis simplifies the process and is conducive to accuracy.

Among the pioneers in the use of income capitalization in land appraising have been the Federal Land Banks. They are compelled by law to make "the earning power of the land a principal factor in appraisal."[2] They have for years carried this as a check against the values which they set on farms by the comparative process.

The income capitalization method of determining land values, when reduced to its ultimate simplicity, shows that basically it is not a highly complicated theoretical process. This is illustrated by the following total figures taken from an actual Indiana appraisal:

Total Annual Income	$1,283.00
Total Annual Expense	599.00
Net Income	$ 684.00
Income Capitalization Value at 5%	$13,680.00
Comparative Adjustments	2,080.00
Basic Value	$15,760.00

Thus, an appraisal could be made by merely setting down four expressions of opinion, i.e.:

1. An opinion as to the total annual income that a property will produce.
2. An opinion as to the total annual expense.
3. An opinion as to the proper capitalization rate to be used.
4. An opinion of the amount of the total comparative adjustments that should be made for all factors not adequately reflected in the income figure.

No one, of course, should be satisfied with an appraisal which was made upon the basis of such wholesale expressions of opinions even though that has been the accepted practice in making farm valuations until recent years.

What actually occurs is that the appraiser probably uses a hundred or more expressions of opinion as to soils, crops, acreage, yields, prices, and expense items in arriving at an estimate of future net annual income. By an equally detailed accumulation of individual opinions, some ten or twelve comparative adjustments are normally considered, so that when the basic value is finally set it is the product of two hundred or more separate opinions, most of which are recorded in the appraisal report. Contrast this with other appraisal methods where the appraiser, after viewing the property, records one "lump sum" opinion of value.

Experience shows that appraisers tend to neutralize their errors in thus building an appraisal value from some two hundred opinions. The law of averages tends to operate. Most appraisers are not continuously high nor low on the wide variety of factors with which they deal in making an appraisal. If there is serious error on one or more factors out of a total of two hundred, the error may not greatly affect the final value. On the other hand, if the value is set by the old "lump sum" method and there is an error in the single expression of opinion, there are no offsetting nor corrective factors. Such appraisals have resulted in many unfortunate farm loans and farm investments and have otherwise caused untold damage.

COMPARATIVE APPROACH

Valuation by comparison is the establishment of property value according to the known or recognized value of other comparable property or factors and elements of properties.

The basis of comparison is actual and not typical. It is based upon a complete assembly of all factual data in regard to the property, factor, or element under consideration and its comparison with other properties, factors, or elements.

The use of both the income capitalization and comparative approaches to value is necessary in every appraisal, and one should not be emphasized to the minimization or exclusion of the other.

The comparative approach is a more indirect method than that of income capitalization, but it is an equally important method of determining value. This is the process by which farm land appraisers, for years, have been setting value on land.

THE JOURNAL OF THE AMERICAN INSTITUTE OF REAL ESTATE APPRAISERS (copyright, 1938, National Association of Real Estate Boards).

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[1] *Rural Appraisal Standards of the American Society of Farm Managers and Rural Appraisers.*

[2] C. W. Hatch, Farm Credit Administration.

THE AMERICAN RURAL APPRAISAL SYSTEM

By this method alone, and without recognizing just what they were doing and how they were doing it, farm appraisers made land appraisals upon a purely comparative basis. Although we now recognize this as an important part of the appraisal process, we further realize that when used alone it is totally inadequate.

Since this approach, if used independent of the income capitalization method, would of necessity include the income value, it is expedient to use the comparative approach as a basis of adjusting the income capitalization value.

The adjustment figures arrived at by comparison show only the value influences not already reflected in the income value.

In making comparative adjustments, both economic and home-use factors should have consideration. Important factors under each are:

Economic Uses—Location and Physical Factors.
1. Roads and transportation.
2. Marketing facilities.
3. Outside employment possibilities.
4. Community factors affecting income.
5. Nuisances.
6. Hazards.
7. Improvements.
8. Natural resources.
9. Physical features.

Home Uses—Aesthetic.
1. The home—house.
2. Yard—landscaping.
3. Recreational and scenic factors.
4. Church and school.
5. Neighbors and neighborhood.

Reproduction Cost

The reproduction cost approach to value estimates is given less emphasis in rural appraising than in urban appraising for a number of reasons, primary of which is the fact that the value of the land in a farm normally far overshadows the value of the improvements. It seems expedient, therefore, that the reproduction cost should be used primarily in reporting and analyzing only the value of the improvements.

Buildings and other comparable improvements are appraised upon the basis of reproduction cost less observed depreciation and obsolescence. Such appraisals of fractional parts of the property are used primarily as factual information supporting the income value and the comparative adjustments.

We have now come to realize definitely that we must think of farms as a unit and subject to valuation only as units. The old summation process has been completely discredited by both urban and rural appraisers. It is not practical nor sound to value land and improvements separately and to use the total as the value of the property as a whole. Hence, in the American Rural Appraisal System, although we make a complete appraisal of the buildings by the reproduction cost approach, the building value thus determined is used only to support income and expense items and comparative adjustments for such features as home uses.

Basic Value

The basic value of a rural property is its worth derived from earnings under typical operation and from the location and other economic and home uses. It is obtained by the standard application of the foregoing principles and is determined in making every appraisal regardless of the purpose of the appraisal.

Appraisal Reports and Procedure

Appraisal reports are comprised of three methods of presentation, i.e.:

1. Mathematical calculations and analyses.
2. Descriptive or narrative statements of facts and their interpretation.
3. Graphic or pictorial presentations.

Every appraisal report covering rural real estate must make use of all three methods of reporting and interpreting facts. In an orderly method, data are accumulated and given expression in the build-up to the final value estimate. Contrast this with the mere accumulation of facts assembled in farm appraisal reports of former years, much of it on a "yes" and "no" blank-filling basis, with no thought of marshalling this conglomeration of questions and answers into an orderly array from which step-by-step conclusions could be drawn in approaching the ultimate and very vital figure which the appraiser established as the property value.

A practical procedure and logical sequence in making appraisals according to the American System is briefly as follows.

A thorough personal inspection should be made of the property under conditions favorable to a complete observation of the entire property and an accumulation of all essential facts about it.

A general map should always be made as a result of the inspection of the property. It need not have the accuracy of a survey, but it should be drawn to a definite scale and should show the following:

1. A complete and accurate legal description.
2. An outline of the property.
3. Location of important topographic and natural physical features, such as streams, ditches, timber, etc.
4. Location of improvements, such as buildings, fences, and roads.
5. Field layout and land-use map.
6. Legend to facilitate identification.

Special maps such as those showing soils are frequently used.

The maps are important graphic or pictorial presentations enabling readers of the appraisal report to visualize the property.

The data gathered in the field should be organized and written into a comprehensive report. Facts should be recorded and then interpreted both by statements and by value figures.

The document should show:

1. Date of the appraisal.
2. Description of property.
3. Basis of valuation.
4. Supporting data and analyses.
5. Conclusions.
6. Limiting conditions, if any.
7. Signature and/or certification of the appraiser.

The narrative part of the appraisal report is the descriptive or word picture of the property in which all of the valuation elements are discussed.

The end product, of course, is basic value, which is developed by determining, first, the income value and, then, by comparative adjustments, bringing this to the basic value of the property being appraised.

Distinctive Features

There are a number of features which distinguish the American Rural Appraisal System from other farm appraisal methods. They can be enumerated briefly as follows:

1. The valuation process is a step-by-step analytical development.
2. The amount of value contributed by each major source is shown separately.
3. Farms are appraised as units and not by a summation of land and building values.
4. The income value is calculated first.
5. Income and expenses are based upon typical operation.
6. By the comparative process, adjustments are made of the income value rather than by setting up a complete independent value.
7. Adjustments are based upon comparisons with the actual. (Assumed additions or improvements are never used as a basis for comparison.)
8. Both the income capitalization and comparative approaches are used in every appraisal.
9. Basic value is determined in making every appraisal.
10. Various kinds of value, or values for different purposes, are departures from basic value.

Conclusion

The varied methods of individuals and organizations undertaking to set values on rural property made it timely and expedient that some definite appraisal system be developed. To that end, the American Rural Appraisal System has met a long-felt need. As it undergoes further refinement through continued use, there should be a great increase in public confidence in the work of rural appraisers who follow such a detailed, organized, systematic approach to appraisal values.

Realtors and the clients of Realtors should welcome a system that gives dependable values upon which to base loans, purchases, sales, and all types of farm real estate transactions.

1050

Loans & Credit

1050 Loans & Credit

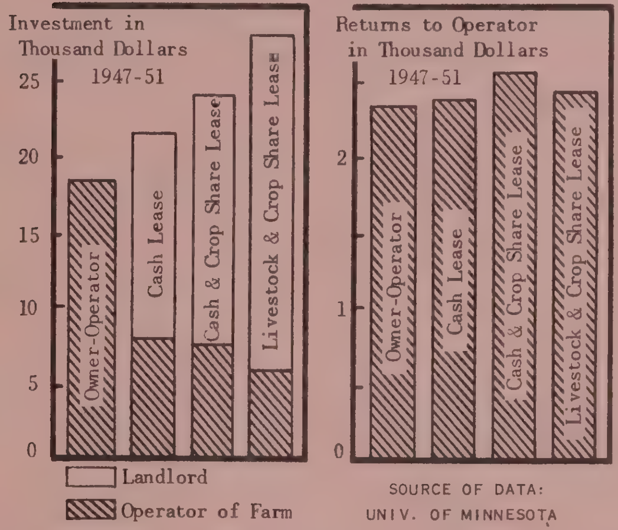
TO THOSE WHO LEND AND BORROW MONEY

GETTING A START IN FARMING

It does not take as much money to get started in farming as most young folks imagine. It does take ability and lots of patience.

The graph shows that the total money a "Beginning Farmer" puts into the business has little to do with his gross income. Rather, income tends to increase as a man demonstrates his ability to use a larger total investment.

AVERAGE INVESTMENT OF OPERATOR AND LANDLORD, AND RETURNS RECEIVED BY BEGINNING FARMERS



SOURCE OF DATA: UNIV. OF MINNESOTA

After making allowances for the use of borrowed money, the differences in managerial ability become even more apparent. In the Minnesota study, a "Beginning Farmer" on a livestock and crop share lease had only $3,295 of his own money in the business. Thus he had an income of more than $3 for every $4 of his own money invested. By contrast the owner-operator had $9,385 of his own money invested and received about $1 in income for every $4 he had invested.

OUTSIDE INVESTORS

Absentee ownership of land is to beginning farmers what the stock market is to the laboring man and professional people. Absentee ownership is one means by which the capital investment necessary to finance a modern family-type farm is carried over from one generation to the next. That is why there is always room in agriculture for outside investors.

John D. Black, prominent economist of Harvard University, expressed the same idea before a farm audience in Des Moines last winter when he said, "I have figured out that in an ideal tenure system for the country, 30 to 35 percent of the farms need to be rented in order to give young men a chance to climb the tenure ladder to best advantage."

Black went on to offer this advice to beginning farmers, "Young men with no managerial experience except on their home farms, and no more help from parents than frequently available, are well advised to make their first venture in farming as tenants. And to use their limited capital and what credit they can obtain all as working capital."

Businessmen, farmers, doctors and others who have saved some money and wish to make a contribution to agriculture may well include farm land as a part of their investment program. Buying a farm as an investment is not unfair to beginning farmers. In fact, it may be the means by which a worthy young person gets his start in farming.

A farm investment brings with it greater responsibility than many other investments. A farm is something to be held in trust and passed on to future generations in better shape than when it was received.

The question of farm ownership thus becomes that of managing one's own personal money affairs. This applies equally to farmers and to non-farm investors. Most beginning farmers cannot afford to own their own farm because this ties up too much of their own money. Stanton and Nodland who conducted the Minnesota study say, "If his (a beginning farmer's) funds are limited to less than $8,000 he will be wise to buy livestock and machinery and start as a renter.

"Part of this capital must be reserved as cash to pay regular operating expenses... Buy only machinery that is needed. Start with used rather than new machines... Regular cash income with a small original outlay is important. Hogs and poultry provide a quick turnover of investment during the first years while getting established. Cash crops may be advisable."

IS THIS A GOOD TIME TO BUY?

The answer to this question is not easy because personal factors as well as economic factors must be considered.

Land prices always follow farm prosperity. A lag of one to two years is normal but when farmers prosper the price of land is bid up, and when they have hard times land prices

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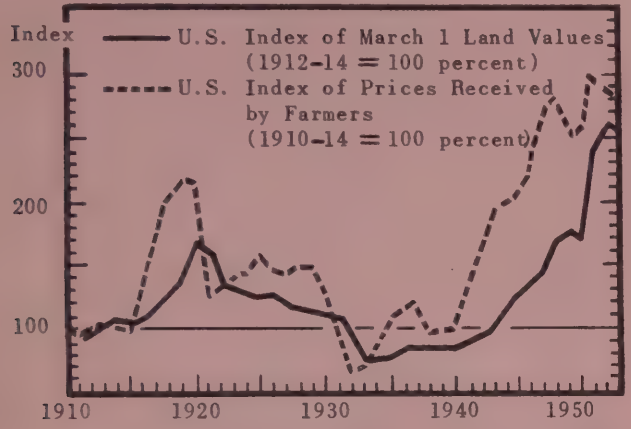
TO THOSE WHO LEND AND BORROW MONEY

decline. Right now there is no way for the average price of farm lands to go but down. The best black lands of the Corn Belt will resist this trend. Marginal and livestock areas may be hard hit, although we do not now see a break in land prices comparable to 1920-22.

PRICES RECEIVED BY FARMERS & LAND VALUES
UNITED STATES 1910-1953



Source of data: USDA

If a man never grew old, the question of whether or not to buy now would be easy. It could then be said without hesitancy that he could afford to wait, because the land price adjustments expected will be short-lived. But life is short and uncertain. We are convinced that over any period of 15 to 20 years, which might be selected, land prices will advance.

☞ Thus, for the man under 40 who can put up as much as 50 percent of the purchase price without depleting his operating reserve -- buying good land to farm himself, looks like a good gamble. Younger farmers who can apply that much money against the price of an adequate farming unit have little to lose by going ahead.

It is a major mistake for a young farmer to buy a farm unit that is too small. The pride of owning one's own farm is not worth that much. A good manager may never have the chance to use enough money in a small business to make the most of his ability.

☞ Older farmers should go slow now unless they can put up more than 50 percent of the purchase price. But for the man past 55, a small farm may be just the ticket to take care of him and his wife in their declining years.

☞ Investors, who will not farm the land themselves, should recognize that the returns on money tied up in farm real estate are relatively low. Profits are not guaranteed. In fact, profit margins vary widely. For this reason, it is unsafe for non-farming landowners to tie up large amounts of borrowed money in their farm land investments.

Buying a farm with the intent to operate it with hired labor multiplies the problems of most farm investments. A hired man has only his job to lose if the pigs chill or the milk cows go without water. But a tenant operator will give his best. He has more to lose than the owner when things go wrong. It is almost an axiom of business that your money is safe in the hands of another man when he stands to lose more than you do if he makes a mistake.

FARM CREDIT TODAY

Highlights from the Second National Agricultural Credit Conference of the American Bankers Association:

Credit is now as much a part of farming as farm machinery. Financial position of farmers is generally good. Country banks also in a strong position -- A big difference compared to the early 1920's.

PROBLEMS FARMERS FACE -- Acreage restrictions due to both abnormal production and increase of other countries' production capacity. Changes in utilization of farm products. Cyclical movements of beef cattle numbers and prices. Fortunately these changes are taking place during a period of high consumer purchasing power.

The 30 percent drop in beef cattle prices bruised a lot of pocketbooks. The past year was painful -- but was inescapable. In only 11 years since 1910 have cattle prices been higher relative to other farm prices than in 1953.

Proven livestock operators will continue to get necessary credit -- but cattle are a big business and demand close attention.

POLICY FOR CATTLE FEEDING LOANS: Be able to talk the farmer's language and give good advice. Visit the farmer and see what kind of job he is doing. Be able to work out an intelligent program. By nature most feeders are optimists -- may be necessary to hold some back. It's second nature to overestimate the amount of feed on hand.

The success of a dairy production loan is not determined by the form in which the milk check is assigned. Only now are many learning that dairying can be a business rather than a habit. A good standard: 200,000 pounds of milk produced per year per man.

With good business, expect farming to be like 1922-27. A parity average of 87 percent.

→ Not the time to run for cover -- but not the time to loan to anyone; efficiency much more important than it has been in the past; good business to spend money to make money; consolidate credit; not the size of loan that counts but the ability to pay it back.

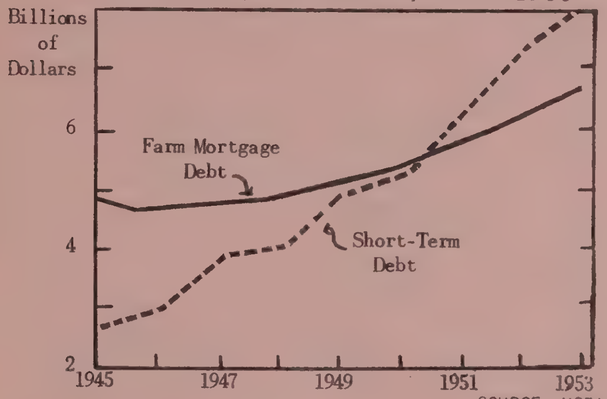
The real need for farm machinery has not been satisfied. Will need an expenditure of 2.5 billion dollars in new equipment each year to maintain present mechanization.

TO THOSE WHO LEND AND BORROW MONEY

Farm prosperity is fading. Some farmers are already in debt over their heads. A lot of farms and ranches have loans on them for the first time in 20 years. Short-term debt exceeds mortgage credit and is going up at an alarming rate.

Since 1945 the short-term debt of farmers has almost tripled. Mortgage credit was low in 1945 but has increased steadily since that time.

FARM MORTGAGE AND SHORT TERM FARM DEBT, JANUARY 1, 1945-1953



SOURCE: USDA

If we turn back in history to the early 1920's we find that the problem was the same. Then short-term credit only got up to about 4 billion while mortgage credit boomed to more than 10 billion in 1921. Mortgage credit went up to almost 11 billion during the next 2 years. Farmers and those who make farm loans should restudy the record carefully. There's an old saying that "a stitch in time saves nine".

The following 10 point program worked out by V. B. Hart and Stanley W. Warren* of Cornell University, two of our nation's top farm economists, may help in this time of storm.

WHEN THE PRICE LEVEL IS FALLING

"During a storm the first thought of the captain of a sailing vessel is to adjust the sails and rudder so as to protect the ship and bring it safely into port. The following are some farm management suggestions recommended for keeping a farm ship on an even economic keel during the period of a falling price level.

"1. Follow a more conservative system of farming. In general this means using available labor, dollars, and power on the higher-yielding acres, animals, and enterprises, but at the same time protecting land, buildings, and equipment from serious permanent deterioration.

"2. Keep debts under control and watch credit standing. Most debts are payable in dollars rather than in bushels of corn, bales of cotton, or hundredweight of milk, so a declining price level makes debts harder to pay. Also, credit is harder to obtain when prices are falling than when they are rising.

"This means: When you are borrowing money to buy something, remember that when your note comes due, what you bought may be worth less than what you paid for it. Make sure that you do not commit yourself to repayment terms on a loan that you cannot meet if the prices go lower.

"Protect your credit standing at the bank or production credit association by being prompt in taking care of your obligations; if unable to meet the payment on a note, the time to see if you can renew it is just as soon as you know you are not going to be able to pay it, rather than the day after it is due.

"3. Make more effective use of labor. When the price level falls, wages go down less than prices of farm products. This calls for getting more production per hour of labor, not so much by working harder as by paying more attention to getting higher production per acre and per animal, making inexpensive changes in building and equipment arrangement that will save labor, and planning chores and field operations.

"4. Cull livestock more closely. It takes a better animal to pay its way when the price level is falling than when it is rising. Also, when the price level is low there are frequently excellent opportunities to buy good foundation stock at low prices.

"5. Do more home repair work. When the price level falls, wages of carpenters, masons, plumbers, and electricians fall less than farm wages. Time spent in repairing buildings and equipment with farm labor will, therefore, pay good dividends.

"6. Take better care of equipment. When the price level falls, prices of machinery, spare parts, and wages of skilled labor for making repairs stay relatively high...A farmer can afford to spend more time in repairing, adjusting, and housing machinery and equipment.

"7. Do more retailing. As has been pointed out, when prices in general decline, prices the consumer pays for farm products go down less than prices the farmer gets for them at the farm. This means watching for ways to

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TO THOSE WHO LEND AND BORROW MONEY

sell direct to the consumer at roadside stands, at public markets, or by direct sale at his door.

"8. Consider doing more outside work. When prices of farm products and farm wages are both lower than city wages, time spent doing commercial hauling with a farm truck or working part time in a local garage or feed store, and similar outside jobs, will often give a higher return than producing farm products.

"This is especially true if the size of the farm business has been reduced so that some member of the family can be spared for part or all of the time from farm work and can work outside but live at home.

"9. Produce more food for the family. When prices of farm products are low compared with retail prices of food, the farm family can afford to have a bigger and better garden and to produce more home-grown meat. In a period of a falling price level, these live-at-home jobs are often the best-paying enterprises on the farm.

"10. Get credit from credit agencies like banks and production credit associations and pay cash for purchases at places where a discount for cash is given. These things always pay, and more than usually so in a period of declining prices when merchants and dealers are asked to extend an unusually large amount of credit."*

A NEW ERA

Hart and Warren believe that it is only "human nature to expect the present to continue into the future...During the low-income years of the 1930's many good farmers became so badly discouraged with the current situation that they said, 'There just isn't any money in farming', and they went into other lines of work. And during the 1940's, when the general price level was rising rapidly, the sons of many of those same farmers who rolled up good farm incomes on a rising price level thought their success was due to being a lot smarter than their dads. Both the fathers and the sons were influenced too much in their judgment by thinking that present conditions would always prevail.

"As society has become more complex, the effects of violent fluctuations in the general price level have become increasingly serious, and we have had bigger and better booms and depressions. Nothing has been done to prevent those violent fluctuations in the price level.

"The wholesale bankruptcy toward which the country was started following the violent drop in prices after the boom days of the 1920's was halted by revaluing our dollar. Revaluation saved the patient in one case of price level fever, but it did not immunize him from future attacks.

"Many persons believe, however, that when we revalued the dollar we did something to the old general price level that tied it up so that we would have no more violent price fluctuations in the future. Nothing is further from the truth.

"The general price level is still free to go on those economic binges and to have the hangovers that inevitably follow them.

"Every farmer and other businessmen should remember four things. These are:

☞Changes in the general price level have made and broken more people financially than any other factor.

☞The general price level has never been stable for any long period of time.

☞The general price level has not been stabilized.

☞The nature of farming is such that it is affected much more by changes in the general price level than are most other businesses."*

AGRICULTURAL POLICY

Farm policy under the Eisenhower administration is unfolding slowly. A coordinated effort is being made to develop a "grass roots" program by going direct to farmers through the farm organizations.

True D. Morse, Under Secretary of Agriculture, in a recent speech, put it this way:

"We are engaged in what is probably the biggest coordinated, privately conducted effort in the democratic evaluation of farm programs ever seen.

"There are three tasks that must be accomplished before wise agricultural policy can be laid down.

"The first is to agree upon the broad objectives which we recognize as desirable. In a Democracy, this is a task for all of us.

"The second is to designate alternative means by which.......achieved.

"The third task is the choice among the alternatives, which is a major responsibility of the Congress.

"Equality of economic opportunity is a basic right of agriculture and the pursuit of this objective is a responsibility of government. The small size of the typical farming unit and the limited bargaining power of farmers make it necessary that agriculture receive public assistance in research, education, and marketing.

"Farmers should be protected from the more violent price fluctuations of the free market. Farmers should be afforded some protection against them.

"Under present programs, price support is given chiefly for certain of those commodities, which are capable of being held off the market through storage. Other commodities, which bring in about 60 percent of the farm income, are virtually without support. This situation is not only inequitable, but is awkward economically."

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* Reprinted by special permission from Farm Management Manual, 2nd Edition, by V. B. Hart and S. W. Warren, Comstock Publishing Co, Inc., Ithaca, N. Y.

Special Message To —

TO THOSE WHO LEND AND BORROW MONEY

So much is said about inflation and continued boom in price levels, that it is easy to overlook the danger in the present situation.

There will be price breaks along the way -- severe enough to cause serious trouble for some of those deeply in debt.

There will be drouths and crop failures severe enough to "bust" farmers and ranchers with finances spread too thin.

Failures in business have been increasing and that no doubt also applies to farmers. On a recent swing through the West we were told of several operators who had been closed out.

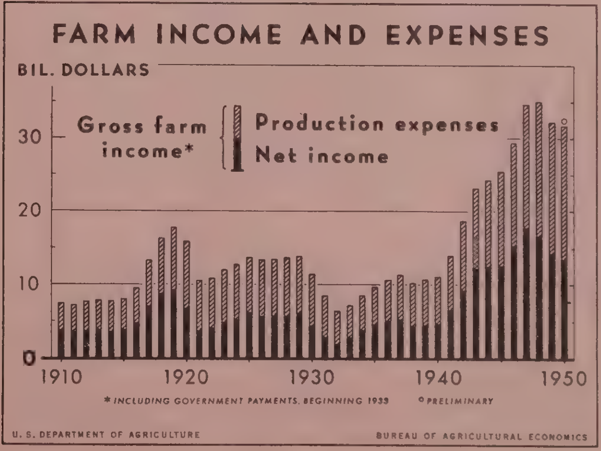
One bought cattle too high to graze out profitably. Another hit a dry spell that rapidly ran up feed bills.

There is case after case of operators deeply in debt, driving expensive cars, and maintaining families on a costly basis. If prices go down or costs take an unexpected jump, such operators will sink quickly.

☞ One big risk is the fact that nearly one-half of the present operators have experienced almost continually -

rising prices and
above average crops and pastures.

See the big up-trend in both income and expenses in the graph -- from 1940. When adversity strikes they will not know by experience how to meet it -- they have never struggled through a drouth or recession.



* INCLUDING GOVERNMENT PAYMENTS, BEGINNING 1933 ° PRELIMINARY

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

It Takes Cash to farm or run a ranch. During these recent lush years farming has made a tremendous shift --

away from self-sufficiency,
to commercialization.

It now takes cash -- lots of cash to run a farm, ranch or plantation. Cash requirements extend from seed and baby chicks to bottled gas and electricity.

☞ Cash requirements are a big risk in present farming with which most farmers are not yet familiar. They have not yet had to deal with BIG cash requirements under adverse conditions.

Proof -- Cornell University in New York state says, "The high expenses associated with modern farming make it possible for a farmer to lose his farm in a short time if he is unsuccessful because of low prices, bad weather, or poor management".

It works both ways -, "The high receipts associated with modern farming make it possible for a farmer to pay for a farm in a short time if good management is combined with favorable prices and weather".

☞ What Cornell is saying is -- farmers now make money more rapidly when prices and yields are favorable.

-- AND likewise they will go broke more quickly when prices and yields go down.

The first successful farm business survey in the United States was made in Tomkins County, New York in 1908. It has been repeated by Cornell every 10 years.

→ "Real estate investment as a per cent of the total declined with each succeeding year of the study.

→ "Livestock and equipment investment ... both increased ...

→ "Receipts per farm were nearly 9 times greater in 1947 than in 1907.

→ "Expenses per farm increased 14 times..."

"Forty years ago a farmer could have continued to operate for a long period of time even though expenses did not equal receipts. He could have liquidated some of his capital investment to cover expenses ..."

☞ "By 1947 this was not so easily done." A farmer could no longer meet a large share of his expenses for a long period simply by liquidating capital.

DOANE AGRICULTURAL DIGEST ® DEC., 1950

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TO THOSE WHO LEND AND BORROW MONEY

Debt Is Not As Important as high cash costs of operation -- in causing modern farmers to go broke when stresses come.

"In 1907, the farmer abhorred debts" and well he should, because debt free farmers had operating costs one-third less than those who owed for all their capital.

In 1947, debt free farmers in Tomkins County had only an 11 per cent instead of a 33 per cent advantage over neighbors who were 100 per cent in debt.

"A falling price level could also wreck the modern farmer, but not so much because of debts as because of the relatively fixed expense for equipment, gasoline, fertilizer, insurance, electricity and the like.

"Farming has always been a gamble. The stakes are much higher now than they were 40 years ago."

This High Cost Danger Crept Up

→ on BORROWERS and
→ on LENDERS.

High boom incomes have kept the lurking danger hidden. Beware of the dangers of high cash operating costs.

Drouth -- To meet the weather risks in western Kansas the U.S. Department of Agriculture found,

"For a debt-free owner to maintain his income at a minimum of $1,400 in each of the 34 years, he would have had to save 16 per cent of the income above the minimum in favorable years.

"The tenant would have had to save 21 per cent of his surplus and,

"The owner encumbered with a mortgage, 60 per cent."

It is not being done.

Security In Off-Farm Income. Too many money lenders are not placing enough reliance in the loan security which non-farm income gives to families living on farms. Many loans are paid off primarily because of off-farm income.

In 1946 off-farm income of farm families was 5.5 billion dollars and

Net income from farming 15 billion.

A study by USDA shows 63 per cent, nearly 2 of every 3 farm operators' families, received some income from off-farm sources.

It is a form of diversification that can greatly stabilize the family income.

10 Point Loan Program for dairy farmers "soon brought in more loan volume than we could take care of -- and this situation has prevailed generally ever since". This was the reply to our question of the effectiveness of a California bank's advertisements. These specific points were listed in the ad run some time ago:

1. Interest rate - 4½%
2. Any size loan - $1,000 and up.
3. Moderate monthly installments, which include interest, permit you to maintain top production.
4. 100% hay loans at 4½%.
5. Arrange for your hay loan only once each year. Pay interest only as money is used.
6. Buy when and where you like. We provide the cash.
7. Monthly adjustments of hay payments during green feed season.
8. Fast, personal service at the bank or YOUR DAIRY. We understand the dairyman's needs.
9. No mileage charge.
10. Escrows handled at minimum expense.

Do you have tailor-made loan programs adapted to your area?

Do you advertise them - on a frank open basis that inspires confidence.

Money For South. The Federal Reserve Bank of St. Louis in, "Bank Credit and Mid-South Agriculture" states in part,

"One problem that faces the farmer of the cotton belt in moving toward greater diversification is the financing problem ...

"Diversification programs cost money...

"Cost about as much to carry through as the original cost of the farm. But the returns have far exceeded the costs.

"More than half of the loan offices said that the new loans (primarily livestock) paid as well as cotton. ..." Another fourth said "...paid better than cotton production loans".

FINANCING THE FARM BUSINESS, book by I. W. Duggan, Governor of the Farm Credit Administration and Ralph V. Battles, Assistant Chief, Economic and Credit Research Division is now available, $4.00, John Wiley and Sons Inc., New York. "...is designed to cover most of the important financial problems which confronts young farmers, as well as other credit management.

TO THOSE WHO LEND AND BORROW MONEY

The optimism and boom that developed last spring -- plus the outbreak of War in Korea has started land prices up again. These changes have been quickly reflected in the market for land. The increases by 4 months period have been --

up to March, 1 per cent UP
4 months ending July, 2 per cent UP.

The increase since July 1 apparently has been even more rapid than the one-half of one per cent per month shown previously.

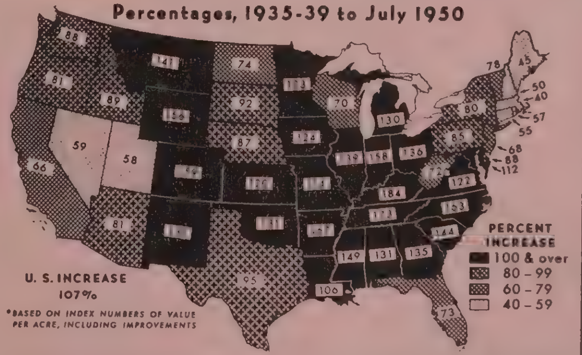
New Peaks in land prices have already been reached in --

Illinois
Iowa
Minnesota
South Dakota.

Most states are again experiencing an upsurge in the demand for land. Even the western states where land prices had declined most have shown an up-trend because of renewed confidence in future prices.

Over-anxious buyers will pay too much for many farms. Those who carry loans on land sold too high should require a wide equity and rapid amortization until the loan is well secured.

INCREASE IN DOLLAR VALUE OF FARM LAND*
Percentages, 1935-39 to July 1950



*BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS

U. S. DEPARTMENT OF AGRICULTURE — BUREAU OF AGRICULTURAL ECONOMICS

The map shows the increase in land prices to July from prewar levels.

In all the states shown in black, land is selling at more than twice what it did 12 years age. In a number of states land prices are more than two and one-half times those of the 1935-39 average.

☞ **The Danger** which both lenders and borrowers must watch is in poor land and inefficient units. Every time land prices are pushed higher this danger increases.

Inflation will shove up costs of operation -- and costs will stay up.

More and more -- poor land and inefficient units will be at a disadvantage. The costs of operation will take all the income and leave nothing to pay interest and to repay loans.

The premium you can afford to pay for highly productive land increases with each new development in mechanization and with most other modern advancements.

Taxes are an example of ☞ rapidly advancing fixed costs. It is estimated that they went up 8 per cent on farm land during last year and are at a "new all-time high of 62 cents per acre. . ."

They will continue to go up.

Taxes alone will absorb most or all of the income from millions of acres now being purchased or held at inflated prices.

· Beware of taxes.

In Texas the tax bill on farm and ranch real estate has ☞ shot up 40 per cent in three years -- up 15 per cent in 1949.

The Agricultural Experiment Station concludes ". . .for the long term it is likely that some upward trend will continue. . .at a less accelerated rate. . ."

Every dollar advance in taxes reduces earning value by $20 based on a 5 per cent interest rate.

Farm Debt Rise has been rapid for 4 years -- UP 42 per cent from the 1946 low. The non-real estate debt has accounted for most of the increase.

Total farm indebtedness is up only 12 per cent from 1940. During this time the value of farm assets more than doubled and --

Net farm income is now about two and one-half times the prewar level.

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TO THOSE WHO LEND AND BORROW MONEY

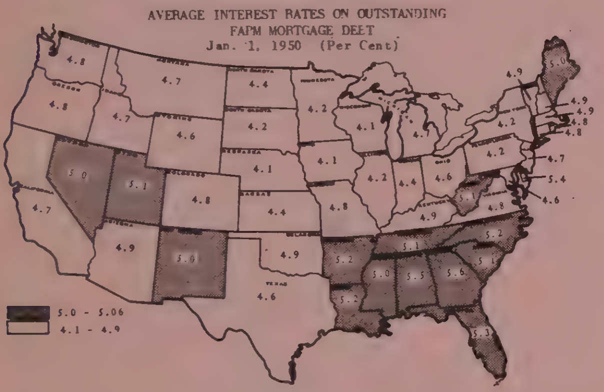
The farm mortgage debt has gone up for four years -- 4 per cent during 1949 and up 16 per cent from the low of early 1946. In half the states the increase has been 30 per cent or more.

The 5.4 billion dollar farm mortgage debt of January 1, 1950 is below the 7.1 billion, 1935-39 average. Following World War I the mortgage debt was 10.8 billion dollars -- double the present level.

The Chicago Federal Reserve Bank says, "Farm debts generally are at moderate levels. . . ☞"Debts likely to rise further . . . particularly. . . farm mortgage debt."

There will be increasing opportunities to lend money on farm mortgages.

Interest Rates Stable for ten years. There has been little change for farm mortgages -- U.S. average has remained near the present 4.6 per cent.


AVERAGE INTEREST RATES ON OUTSTANDING FARM MORTGAGE DEBT
Jan. 1, 1950 (Per Cent)

There are, however, wide differences between states -- 1.5 per cent. The low average interest rates of 4.1 are in Iowa, Nebraska and Wisconsin. The high average is in Georgia, 5.6; with Alabama, 5.5 per cent.

War Risk -- "Last January I was classified 1-A. . . they told me nothing to worry about and to go ahead and plant. . .

"Now I am practically drafted. . . I went to see the Board today and was told I would not be able to pick my corn. . .

"Farm 430 acres -- have 43 cattle and 40 hogs.

"Would you advise selling everything. . . or store equipment?", this Digest client asks.

In lending to men in the military reserve and to young men don't overlook the fact that a quick sell-out may be necessary.

Pennsylvania -- About 150 bankers gathered August 24 and 25 at the State College for the 5th annual Farm Management Clinic.

"Sophomores" studied machinery, its use value and loan values.

"Freshmen" visited a typical farm that needed extensive rehabilitation -- both land and buildings. A complete plan had been developed for the able 26 year old farmer.

At the final joint meeting our President, True D. Morse spoke on, "Economic and Farm Management Services for Farm Customers".

The 296 acre farm, over 100 acres in timber, was given a present market value of $20,000. The College staff program called for $17,620 "New Capital" expenditures.

The farm value would be increased.

Net farm income would go up --
from $3,869
to $6,365

N. P. Mortensen, President, First National Bank, Greenville, Pa. ably discussed how a bank should approach the financing.

Money would be loaned for soil treatments;

For cow barn remodeling to get 34-cow capacity instead of present 18 -- barn had not been changed for 50 years;

For one silo -- wait for farmer to demonstrate his further capacity before building the second silo;

For 8 more cows and 8 heifers -- good ones;

For $200 poultry house improvements;

For $1,500 to be spent on the house. Mortensen said, "Need to keep farm homes near present living standards if families are to be contented and progressive".

About one-third of the proposed expenditures would be postponed until they could be made out of earnings.

On several items the banker proposed loaning more than recommended -- the home expenditure was the major increase.

For $95 changes could be made in the poultry house that would save 347 hours work per year -- almost 1 hour per day. Automatic water and nests all at one end to cut egg gathering time were to be the big labor savers.

Partitions would be removed -- poultry specialists cited farms where as many as 7000 layers are successfully housed in one room.

Other recommendations included -- sell the bull and use artificial breeding, join the Dairy Herd Improvement Association, breed for more fall freshening, buy a good milk cooler, sell the 2 horses, and quit custom work and spend all time on the farm.

☞Every farm needs a close study to cut out needless labor and waste. Big savings can often be made with small expenditures -- opportunities for both lenders and borrowers.

TO THOSE WHO LEND AND BORROW MONEY

Do not be misled by the upturn in the farm real estate market for the 4 months ending with March. "A slight rise. . .1 per cent above last November. . ." The peak in land prices has been passed. The general trend will be down over a period of a year.

Sales Are Down -- The number of voluntary sales of land continued down for the third consecutive year. When sales volume declines -- land values follow down.

All regions reported fewer voluntary sales.

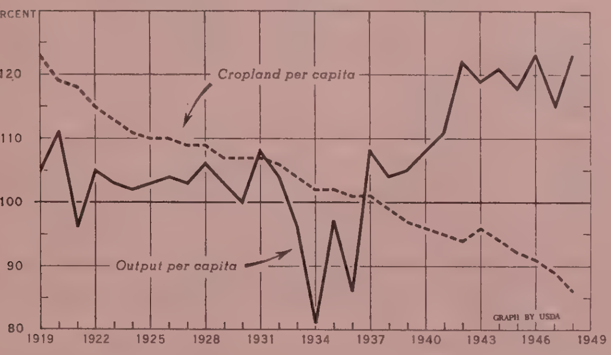
More sales are being made on credit -- up 5 per cent.

☞"Mortgage debt on new farm purchases has averaged 50 and 55 per cent of the purchase price in recent years".

This indicates loans are being made for the full price that the farms would have brought 10 years ago -- even more in many cases.

Both lenders and borrowers should proceed with caution. The squeeze on farm profits will continue.

See pages 313 to 320 for details.



(Index Numbers 1935-39 = 100)

LESS Cropland Per Person
MORE Farm Products Per Person

Weather accounted for about one-fourth of the increase over pre-war production of farm products.

Surplus Acres -- In the May "Agricultural Situation" the U.S. Department of Agriculture summarizes the shifts expected because of surplus acres. This is more evidence of the extent to which the debt-carrying capacity of farms may be reduced due to governmental programs.

Whether you borrow or lend money, keep the size of the debt within the limits of the amounts that can be repaid -- under restricted farm production.

→ A CORN BELT "warning" is issued, ". . .big adjustments to make".

According to the USDA authorities, 11 million more acres put into cultivated crops like corn and soybeans during the war will need to be partly shifted into hay and pasture. "The growing stocks of corn and lower prices for pork and lard, especially lard, resulting from the slackening of wartime demand --

"are a warning to farmers. . ."

It is a WARNING to both borrowers and lenders.

Cattle price trends, ". . .probably will be downward. . ."

". . .the return for each hour of labor may not be so large. . ."

→ For the SOUTH -- the authorities state that "New Pastures Show Promise" for use on the "Surplus" acres. ". . .even on smaller farms, forage and grass may provide a profitable alternative."

On many farms this shift is "needed for soil conservation".

Many small farms will need to be made larger -- for dairying and livestock --

and for mechanization.

Woodlands are suggested as "a possibility".

It adds up to less intensive use -- but more permanency -- and dependable loan security.

→ The WEST has -- "Major Land Use Problem Ahead". Warning after warning is given by authorities.

"Reductions in wheat acreage. . .one of greatest land use problems ever faced by western farmers."

Fewer alternatives are open. . ."

"Permanent cow herds or ewe flocks involve less price risk and generally are more stable. . ."

". . .farming in our semi-arid wheat areas is gradually depleting the soils".

Certainly the drouth in the southwest is a warning that the high income years with above normal rainfall will not continue unbroken.

☞Loans to farmers must be held down to the amounts that can be paid out of restricted farm production as long as the governmental program cuts out "Surplus Acres".

Re-Appraise full loans -- "Especially if they are to inexperienced farmers". That is the

(Continued on Back)

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TO THOSE WHO LEND AND BORROW MONEY

advise of the Roanoke, Virginia, First National Exchange Bank. "Security values of farmland and equipment are shrinking".

The bank sees the possibility of land values coming down "as fast or faster" than they went up if farm product prices are allowed to seek their own level. That would be a drop of 1 per cent per month.

On new loans that are near the limit, care should be taken to set up amortization at a rate fast enough to maintain a safe margin of security -- to protect both the farm owner and the lender.

Changes To Expect in American farming have been listed by Dr. Sherman Johnson, Assistant Chief, Bureau of Agricultural Economics. Mark this list to use in answering questions, making addresses and in writing articles.

More mechanization until it has largely supplanted animal power.

Further adaptation of machines with each phase of agricultural production mechanized.

Use of lime and fertilizer will rise.

Rapid adoption of conservation practices.

Better crop varieties will be developed.

Systems of farming will improve along with use of more effective crop rotations.

Control of pests and diseases will increase.

More efficient livestock will result from breeding experiments.

Feeding methods will improve with better balanced rations.

Some new land -- from irrigation, drainage and clearing -- but the total new farm acreage is not likely to be large.

Supplemental irrigation will increase.

Many small and unproductive farms will shift to part-time operation or rural homes.

IF opportunities for employment are freely open in the cities.

IF depression conditions, this movement might be reversed.

More residences in rural areas will be established by town and city people.

Fewer farm workers will be needed in full time farming.

Family farms are likely to become larger and somewhat fewer.

Large-scale farms may increase in number -- are not likely to constitute more than a small percentage of the total number of farms.

Commercial farming will become a more complex business.

The foregoing is summarized from "Changes in American Farming", Misc. Publication No. 707, USDA, Washington, D.C. It is a valuable reference for your files.

Young Farmers -- Cultivate your future customers while they need your help and guidance. In a recent credit school we heard such statements as:

We don't have time to bother with the little loans to beginners."

"Let the other lenders have them."

Beginners are apt to continue to give their business to those who had time to give them guidance -- and to take a little extra risk with them when they were getting started.

Success Factors -- Dr. V. B. Hart of Cornell University, New York State, who serves as advisor to bankers states, "Although conditions vary over the country, it has been found that in general the 6 most important factors affecting farm incomes and over which the farmer does have some control are:

Size of business
Production per animal
Crop yields
Labor efficiency
Diversity of business
Quality of land"

Equipment Financing -- "Rules of Thumb" given to Indiana Bankers by Purdue University staff at their clinic this spring included:

1. The equipment must pay its way -- labor, timeliness, volume.

2. The equipment should be produced and handled by reputable agencies that provide good service.

3. The new small equipment has not replaced the "mule" on the 40 acre farm. Used equipment is still the less expensive solution. Big saving in mechanical over animal power is in man labor rather than in power cost.

4. Do not be too optimistic about the amount of custom work available to amortize the loan when a "buyers' market" prevails.

5. Beware of over-investment in all types of equipment, especially in large farm trucks.

6. The modern commercial farm must be a "mechanized farm" to have a sufficiently large volume of business to provide a reasonable standard of living.

7. Lower farm prices equals a smaller margin per unit which adds up to a strong need for more units of production to keep gross income from falling disastrously low. This often means more power and machinery per man, not less.

8. Farm equipment has and will continue to be "gilt-edged" security for low risk loans to farmers on Indiana's commercial farms if loans are made with an "eye" to repayment capacity and not security alone.

Community Room -- William R. Courtney, President of the Mexico (Missouri) Savings Bank and newly elected Treasurer of Mo. Bankers, showed us their community room last week -- air conditioned, basement room. "Popular -- a good investment".

TO THOSE WHO LEND AND BORROW MONEY

"Farmers face a testing period in the fifties, but by the same token, --
"Bankers do too.

"There is a large group of folks who have reserved their judgment until they can see whether bankers are, or are not, "all weather" friends of agriculture.

"Their memories go back to the early thirties, and they ask whether bankers will continue to lend to farmers when there is more hazard than there was in the forties. . .

"Bankers have in their own hands the answer to whether they will continue to serve worthy customers. We have confidence they will." Boston Federal Reserve Bank.

Security Values Are Shrinking -- Land for over a year has dropped in price one-half per cent per month. If your loans were based on recent purchase prices -- were they paid off 6 per cent or more last year? Land values fell 10 per cent in some states.

For 5 years land prices went up 1 per cent per month. Will the decline accelerate and come down equally fast?

Collateral values, livestock and used machinery are dropping in value faster than land. ☞Reappraisals are in order for full loans -- especially if to an inexperienced farmer. Be sure they are on a sound farm plan that will pay net profits on the declining market.

Choosing Bank Or PCA as a source of credit by farmers, according to the Richmond F.R.B. depends upon such considerations as --

"1. Interest and service charges.
"2. Ease of loan application.
"3. Time required to consider applications.
"4. The purchase of PCA stock required with PCA loans, and
"5. General service offered with the loan."

The business by each depends on "vigor, extent, and effectiveness of the competition. . ."

FARMERS HOME ADMINISTRATION loans must be refinanced whenever a commercial bank, Federal Land Bank, or other credit source is willing to take the loan over at a rate not exceeding 5 per cent. Carry a follow-up on them as a source of more loans.

To Make Financial Progress, it was found from a study by the Wisconsin College of Agriculture that --

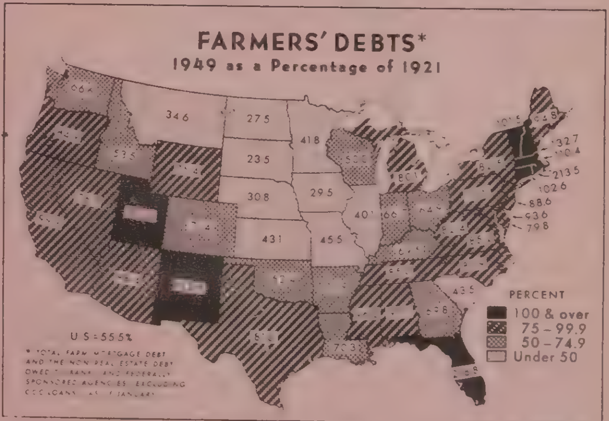
First in importance is the volume of business as measured by size of farm. . ." Both owners and tenants made the most financial progress if they were operating farms with over 70 crop acres."

Management ability ranked second.

Productive soils are essential, ". . .the handicap of poor soils will be difficult to overcome."

Initial net worth does not determine success.

The Strong Financial Position of farmers is shown by the accompanying map of the Bureau of Agricultural Economics, USDA, showing ☞debts only a little over half, 55 per cent, as much as in 1921 following World War I.


FARMERS' DEBTS*
1949 as a Percentage of 1921
34.6
27.5
41.8
23.5
30.8
29.5
43.1
45.5
40.1
53.5
66.4
50.0
80.1
43.5
70.3
132.7
213.5
102.6
88.6
93.6
79.8
U.S.=55.5%
* TOTAL FARM MORTGAGE DEBT AND THE NON REAL ESTATE DEBT OWED TO BANKS AND FEDERALLY SPONSORED AGENCIES EXCLUDING CCC LOANS AS OF JANUARY
PERCENT
100 & over
75 - 99.9
50 - 74.9
Under 50

In a study of the interwar debt distress, BAE brings out such facts as the following.

Great Plains -- Heavy debt burden of farmers resulted largely from failure to recognize the production limitations imposed by ☞the climate. . .newcomers were not acquainted with the weather risk."

Corn Belt -- "Over-optimism resulting in widespread speculation. . .Failure to evaluate adequately the productivity of ☞fringe areas. . ."

Lake States -- Promotional schemes were used to settle cut-over sections. "Fertility of the thin forest soils of large sections was quickly depleted unless soil maintaining rotations were practiced."

DOANE AGRICULTURAL DIGEST ® MAR., 1950
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TO THOSE WHO LEND AND BORROW MONEY

Eastern Cotton Belt -- "One of the worst farm-debt trouble spots. . .Following the decline of cotton prices in 1920 the boll weevil damage became very serious. . ."

"The industrial expansion which has occurred in sections of these states has provided alternate income possibilities."

Among the conclusions are these --

"It is doubtful whether in the future there will be concentrated areas of debt distress resulting from misjudgment of productivity of farms. . .

"Vulnerability. . .primarily associated with the possibility of further declines in agricultural prices. . .

"Distress. . .to occur among scattered individuals whose debt burdens are particularly great or who experience especially severe shrinkage in incomes."

Debts Of Farmers in the Virginias and Carolinas have increased rapidly since January 1, 1945. The Richmond Federal Reserve Bank shows that,

Non-real-estate loans in 4 years went up nearly two thirds, and

Farm mortgage debt increased 31 per cent.

Commercial banks and individuals have increased their total lendings as well as relative share of the lendings.

". . .some individual farmers will find fixed interest and amortization charges rather difficult to handle."

Increased mechanization and commercialization are increasing cash farm operating costs. Non-real-estate credit is being used "to finance purchases of machinery, household appliances, automobiles, livestock, buildings, soil improvements and the currently high expenses of crop and livestock production."

Older Farmers who kept at work during the war are now retiring in greater numbers. The problem of leaving a highly valued, efficient sized farm, equipment and livestock to the child who is the logical successor is often a difficult estate settlement problem when there are other children and heirs. Means must be found so the farm can continue to be operated as an economic unit.

The financial advisers of such farmers have a fine opportunity to be of service in suggesting how contracts, trusts, etc. can be set up to handle the problem. Wills alone are usually not enough -- they are subject to change.

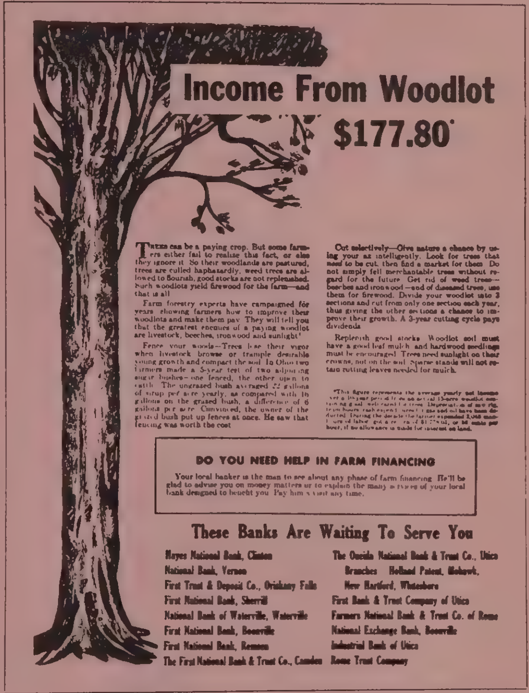
Why not advertise a meeting in which to discuss estate settlement plans and invite especially the fathers, sons and daughters that you anticipate may be faced with such problems. Don't overlook the inheritance tax angles. Financing is usually involved when the transfers take effect.

Congratulations to the Agricultural Commission of the American Bankers' Association in putting "Forestry" in the Program for Country Bankers for 1950.

So called "waste land" needs to be put to work. Every acre should be in a valuable crop -- timber can be one of the most profitable crops -- on the waste land in farms.

For the greatest prosperity of communities as well as farmers, businessmen should join with bankers in vigorous programs to get a crop of trees growing on the "waste land". In many communities it is half the acreage.

The Atlanta Federal Reserve Bank points out that the timber on many farms can be the old age security, retirement fund for farmers.



Income From Woodlot $177.80*

Trees can be a paying crop. But some farmers either fail to realize this fact, or else they ignore it. So their woodlands are pastured, trees are culled haphazardly, weed trees are allowed to flourish, good stocks are not replenished. Such woodlots yield firewood for the farm—and that is all.

Farm forestry experts have campaigned for years showing farmers how to improve their woodlots and make them pay. They will tell you that the greatest enemies of a paying woodlot are livestock, beeches, ironwood and sunlight.

Fence your woods—Trees lose their vigor when livestock browse or trample desirable young growth and compact the soil. In Ohio two farmers made a 5-year test of two adjoining sugar bushes—one fenced, the other open to cattle. The ungrazed bush averaged 22 gallons of syrup per acre yearly, as compared with 16 gallons on the grazed bush, a difference of 6 gallons per acre. Convinced, the owner of the grazed bush put up fences at once. He saw that fencing was worth the cost.

Cut selectively—Give nature a chance by using your ax intelligently. Look for trees that need to be cut, then find a market for them. Do not simply fell merchantable trees without regard for the future. Get rid of weed trees—beeches and ironwood—and of diseased trees, use them for firewood. Divide your woodlot into 3 sections and cut from only one section each year, thus giving the other sections a chance to improve their growth. A 3-year cutting cycle pays dividends.

Replenish good stocks. Woodlot soil must have a good leaf mulch and hardwood seedlings must be encouraged. Trees need sunlight on their crowns, not on the soil. Sparse stands will not retain rotting leaves needed for mulch.

DO YOU NEED HELP IN FARM FINANCING

Your local banker is the man to see about any phase of farm financing. He'll be glad to advise you on money matters or to explain the many services of your local bank designed to benefit you. Pay him a visit any time.

These Banks Are Waiting To Serve You

Hayes National Bank, Clinton
National Bank, Vernon
First Trust & Deposit Co., Oriskany Falls
First National Bank, Sherrill
National Bank of Waterville, Waterville
First National Bank, Boonville
First National Bank, Remsen
The First National Bank & Trust Co., Camden
The Oneida National Bank & Trust Co., Utica
Branches Holland Patent, Mohawk, New Hartford, Whitesboro
First Bank & Trust Company of Utica
Farmers National Bank & Trust Co. of Rome
National Exchange Bank, Boonville
Industrial Bank of Utica
Rome Trust Company

Advertisement of Oneida County, New York Banks

The Board of Supervisors of Jackson County, Mississippi bought a bulldozer to rent to farmers at $5 per hour to convert land into pasture or timber. A Rural-Urban Committee of 5 farmers, a banker, 2 merchants, a newspaperman and the State Representative control use.

Two mechanical tree planters have since been purchased by the Pascagoula-Moss Point Bank to "be loaned free".

A Cut In Salary "is never easy to digest", says the Wichita Farm Credit Administration in pointing out that some farmers and ranchers have exaggerated ideas of the net income that their operations will produce after 8 years of above parity ratio. It will be difficult "to adjust their standards of family and farm expenditures to their sharply reduced ability to pay". "A panic or major depression is not in sight".

TO THOSE WHO LEND AND BORROW MONEY

Evidence continues to pile up warning both those who lend and borrow money of difficulties ahead. Double check new loans -- re-check loans already made.

Land Prices Are Declining -- This fact has been reported to you as the figures became available. Authorities agree the peak is past -- now the question is -- how fast will farm land prices decline?

Don't think of land -- just as land -- all in one class. Such a fuzzy approach will lead to trouble. Classify land AND farmers -- to do a sound loan business.

GOOD PRODUCTIVE LAND will be slow to go down in price. Earnings of recent years have not been fully capitalized into land prices.

Such land did not cause serious loan losses after the last land boom.

ATTRACTIVE HOME UNITS -- Small part-time farms that are well located near dependable employment will hold up well in value. If there is even a small acreage of productive land -- the loan will be more stable than where the property is strictly a Rural Residence -- with timber and scenery.

MEDIUM PRODUCTIVITY LAND is the most risky class. Such land busted borrowers by the thousands and caused huge losses to loan companies after the last war boom. Farms, ranches and plantations on this type of land make good profits at wartime prices for farm products. This is especially true when there is plenty of well distributed rain and crop seasons are above average -- like the past 10 years.

Beware! -- lend or borrow on such land with caution.

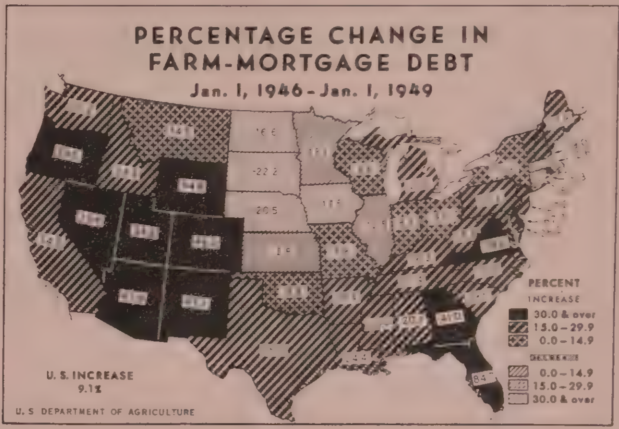
Profits quickly disappear when the price squeeze comes -- and --

Poor crop years hit such farms hard.

POOR LAND and subsistence farms in some areas have had a very good loan repayment record. The reason is that lenders have been well aware that they were lending on poor land and have proceeded accordingly.

Loans are small and costly to make and service.

Beware of taxes on poor land. Vast areas of such land -- especially in range states -- are apt to revert to government ownership because of the tax load. When cattle and sheep prices go down to more normal levels, costs will be cut by leasing rather than paying taxes on extremely poor land.


PERCENTAGE CHANGE IN FARM-MORTGAGE DEBT
Jan. 1, 1946 - Jan. 1, 1949

Two Major Groups of farms and farmers are more and more developing. It is another view to help lenders and borrowers size up debt repayment ability.

1. Commercial farm units that are efficient and managed by capable farmers will continue to produce net incomes. Profits will shrink but will not be squeezed out.

2. Subsistence farms and small units that will not pay operating profits or even all expenses after prices go down further AND additional crop acreage cuts are made.

Allan Kline, President of the American Farm Bureau Federation, is reported as recently referring to this group as operated by, "The depressed farmer who doesn't have the education, the land, the tools, or the experience to produce food economically". Many of these will largely become wards of the government under the farm program.

Mechanization and industrialization will not be practical on 4 out of 10 farms, according to Dr. O. R. Johnson of Missouri University -- "These are farmers we need to worry about". Farming progress has made them more of a problem than in the past.

Figures Showing Your Security are rapidly becoming available.

If you are loaning money -- check your loans on the basis of probable 1950 returns.

(Printed in U.S.A.)

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TO THOSE WHO LEND AND BORROW MONEY

If you borrow -- check whether you can pay interest and make progress in reducing your debt in 1950.

CUT 15 PER CENT OFF of net farm income when you figure next year -- down one-third from the peak -- according to government estimates. Some authorities expect a larger income loss.

CUT THE ACRES of the high profit crops -- you now have actual figures or estimates.

UNCERTAIN price supports. New law leaves most decisions to Secretary of Agriculture.

INCREASED TAXES -- they jumped 8 per cent for farm taxes payable in 1949.

FARM MACHINERY -- prices have dropped on used equipment and automobiles. Make new inventories on conservative levels.

LIVESTOCK -- Prices are adjusting to lower levels. Milk cow and purebred prices face major price reductions. Make new inventories.

BUDGETS were never more needed to protect farm profits than in the year ahead. A new January 1 Balance Sheet and estimate of 1950 income and expenses on a farm will give both the borrower and lender more security.

Land-Use Maps are now available for 52 Ohio counties. They should be in the reference files of banks, appraisers and loan companies.

The maps were made from information furnished by farmers cooperating with Ohio State University and have been printed in color by the Federal Reserve Bank of Cleveland.

New York state and Oklahoma are among other states that have made similar maps. Have your appraisers and loan men get the land use maps that have been prepared for counties in which you are making loans.

Buying A Farm -- As a customer service, have on hand such leaflets as Ohio State University No. 45, "Facts About Legal Safeguards in Buying A Farm". Give them to young farmers or mail them to customers when you know they are considering purchasing.

Missouri College of Agriculture has Bulletin 526 with a similar title.

New Hampshire, Circular 271 raises the question, "Do You Want To Buy A Farm?"

Mississippi State College, Leaflet 74, "About That Farm You Plan To Buy" gives a form for figuring the debt carrying ability.

"What Is Cheap Land?", Digest Page 1007, continues to be good advice for many purchasers. Page 1005, "Suggestions To Purchasers of Farms" can also be purchased in quantities.

Pennsylvania State College has made a study of "Credit Sources, Practices, and Opinions of Pennsylvania Farmers", Bulletin 514. Apply these ideas from the 399 commercial farmers to your business.

"The amount and nature of loan supervision probably deserves more consideration by credit institutions.

"Credit institutions have not made prospective borrowers sufficiently aware of the credit they have available or of the variations in loan terms that might be worked out.

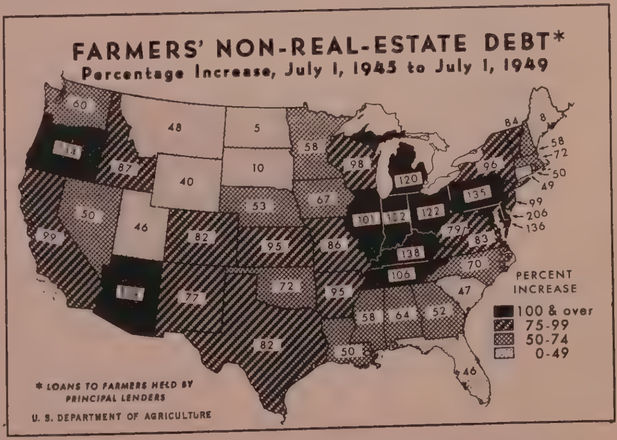
"Credit institutions do not need to be overconcerned about the types or amount of information they request from farmers about their business as long as it will improve the soundness of the loan.

"Personal factors (knowing lender and feeling lender was understanding and lenient) seems to be more important in deciding where to borrow than economic factors (interest rate and loan terms).

"Amortization as a repayment method was selected by 44 per cent of the farmers. Seventy-two per cent favored a plan of varied principal payment based on the price level of farm products.

"Fifty-five per cent of the farm operators said a budget loan plan would be of value.

"A farm loan specialist, in the opinion of 57 per cent of the farm operators, would be of value to both the borrower and the lender. . . 64 per cent of all the farmers thought the lender should visit the farm to see how the borrowed money was being used.


FARMERS' NON-REAL-ESTATE DEBT*
Percentage Increase, July 1, 1945 to July 1, 1949
60
48
5
58
98
120
84
8
58
72
50
49
96
135
87
40
10
67
53
50
46
101
122
99
206
136
99
82
95
86
79
83
138
70
106
72
95
77
47
58
64
52
82
50
46
PERCENT INCREASE
100 & over
75-99
50-74
0-49
* LOANS TO FARMERS HELD BY PRINCIPAL LENDERS
U. S. DEPARTMENT OF AGRICULTURE

"CREDIT IS A DESIRABLE AND USEFUL farm tool in the hands of those who know how to use it, but in the hands of those who do not, it is a dangerous one."

DOANE AGRICULTURAL DIGEST
Facts and Opinions From the Oldest and Largest Farm Management & Appraisal Service in the United States

TO THOSE WHO LEND MONEY

The farm credit business is booming -- if you want the business! That is what private banks, PCA's and other lending agencies are reporting. Too many financial statements are weak and do not justify the loans requested. There are plenty of loan applications.

"It is surprising to see how many farmers that should be in a good financial condition are having to borrow." That is the statement of a PCA President in the Great Plains -- wheat and cattle country. "Banks apparently are again referring to us the weak risks they don't want to handle". And, it becomes a question of when a weak risk is best served by having more credit or less.

WATCH YOUR STEP ——

Merchants, dealers, individuals, banks, PCA's and farm mortgage lenders -- the warning signals are flying. Credit losses are still low but are increasing.

Any who now engage in money lending -- and that means even the extension of store credit -- should adhere strictly to sound credit policies. Failure to be able to collect bills and loans has wrecked many otherwise sound businesses.

Mr. Donald Danforth, President of Ralston Purina Company, last November talked to bankers on, -- "Profitable Business For Somebody -- Does the Banker Want It?" What he said was that Purina has "neither the inclination nor the qualification" to run a banking business, But --

"My company and many others in the agricultural business are being forced against our will and better judgment to become money lenders -- we don't like it. . .

"In my opinion, the man in the best position to provide this credit is the local banker. . .

"It is fundamentally unsound for a manufacturer to become a banker from choice."

Lending money is indeed a business for those who specialize in finances. Others who drift into it are apt to take losses in the years ahead. They will often hurt rather than help the farmer who is given too much credit. Herein exists moral obligation upon the lender.

LOOSE CREDIT ——

When loans are made to customers or tenants, too often a clear cut judgement on the merits of the credit is clouded by the other business relationships.

Land sales are often financed by sellers, neighbors or relatives who do not know the principles of sound credit and who are not students of market trends.

Cotton gins want to sell seed, gin, and buy the cotton, so they finance farmers.

Dealers in the competition to sell machinery, feed, fertilizer and other supplies extend credit.

Land owners trying to get more complete use of their land frequently finance tenants and share croppers.

We have just finished a management report for a Georgia owner -- he will lose a lot of money loaned to tenants to buy tractors, equipment, seed and fertilizer to get more land worked. He is being told to get out of the banking business.

☞ On a down market the favorable credit experience of the past 10 to 15 years is not a safe guide. There have been so few credit losses and even bad checks that merchants and lenders have become lax. Tighten up -- use sound credit procedure -- watch your step.

Mr. Danforth's approach to the financiers is sound -- "We manufacturers are sincerely anxious to work with you as partners. . .Together. . .working as a team. . .we can better improve our service to others and our profits to ourselves."

(Continued on Back)

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CREDIT LOSSES TO INCREASE

SECURITY —

The Bank of Hartington, Nebraska, in its March bulletin carried this statement.

"A common complaint is. . . 'The Bank requires too much security'. No borrower ever gets hurt by giving too much security. Many have been hurt by being given too much credit. When a loan is paid, the mortgage or collateral is always released. No damage has been done. A borrower cannot give and a bank cannot take too much security. What might be considered adequate security today may be wholly inadequate a year from now. When a loan is safely and sufficiently secured both the borrower and the bank are safe. No one gets hurt."

Those who extend credit must again require adequate security. In appraising livestock, machinery, land and other property the values must project the declining trend. Figure values below what they are now.

Look back at what has happened during the past 12 months. Price drops have wiped out many equities. Lower prices are immediately ahead.

One banker wrote, very much concerned about the security back of some of the loans he had made on corn put under government loan. PMA was advising farmers to sell because some of the corn had gone out of condition. In the event of sale the banker figured the corn would bring only $1,000 -- the loan was for $1,500. "Where do I get the other $500?" was the question.

Even government commodity loans may develop security problems.

The Enosburg Falls Savings Bank in Vermont renews chattel mortgages every 12 months and reports that changes of 25 to 30 per cent in the value of the cows is not uncommon.

CUT-BACK ACRES —

Every competent farm manager knows you must have volume to farm profitably. Colleges for years have urged farmers to make "two blades of grass grow where one grew before" and produce more with the same taxes, labor and equipment. Adequate volume is essential to the success of most businesses.

You can't often cut volume and reduce expenses in proportion. Fixed costs like land taxes and insurance stay fixed.

☞ Before you go very far in financing a farmer, figure out what will be his debt paying ability with reduced acres and lower prices. His volume will go down -- his costs will stay up.

A Kansas farmer who has followed recommendations to summer fallow one-half of his wheat land, now gets a 40 per cent cut-back -- "instead of 14.6 per cent as PMA announced in the papers."

Many good farmers who kept acreages in line with sound land management practices will get caught as this man has. Ever since the war we have urged farmers to plant full acres so they would have a larger base when acreage cut-backs came.

"**The Test** of a good farm mortgage loan is whether the farm offered as security will produce sufficient income to provide --

1. "a living for an average family.

2. "pay operating expenses including taxes and insurance, and

3. "leave enough margin to pay interest and principal on a loan."

(That is the lead in the Forward of the American Bankers Association booklet "Farm Real Estate Financing".)

☞ NO! Many, many farms do not meet that test now. More of them can not support a family and pay a loan after the acres of their most important cash crops are cut-back.

A TIMBER SAVING ACCOUNT —

The Federal Reserve Bank of Atlanta, Georgia recommends timber to farmers as a means of accumulating reserves. Cash crop farmers in the South find it difficult to accumulate a savings account -- but a savings account can be grown on the "waste" land.

☞ "Like the conventional insurance policy, it has at all times a cash surrender value and is a convenient means of accumulating savings. . .It can be a valuable adjunct to the farm business..."

Many idle days during the next 6 months can be turned into timber savings accounts by cleaning up and planting timber tracts. Even small areas on eroded land will grow valuable trees.

TO THOSE WHO LEND MONEY

The annual check-up on land prices across the Nation, as of March 1, shows unmistakable evidence that the farm economy is "shifting gears". Certainly no one engaged in any phase of money lending to farmers will fail to study the maps, graphs, and statistics given on the new Digest pages 313 to 316.

It is not enough to refer only to the trend in your particular state or area -- check the developments in other territories. Pay particular attention to trends in areas whose major farm enterprises are similar to those on which you have loans.

The fact that in the four months, November to March, land values skidded to a stop or went down in well over one-half of the land area of the United States is particularly impressive.

Only 7 states west of the Mississippi river showed price increases during the 4 months.

East of the river 8 states declined or showed no land price increase for the 4 months. See the map at the bottom of page 313.

Looming Ahead are farm income limitations that should cause both ☞ borrowers and lenders to recheck their debt position --

1. Acreage restrictions,
2. Grain storage shortages that will force sale of grain on markets far below support levels,
3. Lower estimates of farm incomes,
4. Shrinking domestic and foreign demand.

The day of profits for many farms is passing.

Grading of the farm loans you now hold is in order. It is not too early to red flag the loans that need --

A recheck before trouble starts and
A plan for handling in the event they get caught in the profit squeeze as prices go down faster than costs.

A simple check system should be adequate if you have good appraisals on the farm and adequate files on the borrower.

The farm loan analysis developed for some of our clients carries 42 items -- for checking on an A, B, C, D basis. It starts with soil ratings and ends with "Management Control Reserves to Mortgagee". In less than 15 minutes a trained office girl can grade a loan and point out its --

strong and
weak spots.

It is important that some one who has no pre-conceived notions built up by contacts with the farm and borrower do the grading on an impartial basis according to the file records.

If 42 items are too much detail for your records -- the number of items can be reduced to some of the most vital factors like the following.

→ Soil productivity rating.
→ Crop land, per cent of farm.
→ Improvements, buildings, fences.
→ Hazards, erosion, drouth, etc.
→ Taxes, per cent of earnings or value.
→ Earning value, per cent of total value -- based on long time prices and expenses.
→ Borrowers ability, physical and mental.
→ Size of farm and loan for the type of farm, etc.
→ Financial condition of borrower.
→ Loan plan, term, amortization.

The boom in land prices and farm incomes has been stopped and we are on the way down. It is time to recheck loans in the light of this new trend.

New Loan Officers are in charge of banks, P.C.A.'s, and other lending organizations all across the country. Some have never loaned money except on the advancing markets of the past 15 years.

Such officers need especially to use complete appraisals and loan analysis grades to double check against those factors that cause loans to default.

☞ Lack of experience on a down market can be largely made up by use of complete records and measurements of loan strength and weakness.

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TO THOSE WHO LEND MONEY

On The Spot — In a recent meeting several farmers, apparently directors of their local loan organization, were discussing some of the problems they face. These same problems confront banks that have built up their farm loan business during the past 10 years.

They have bid for business. Farmers are depending upon them for credit. Many will need more credit than is safe. Turning down neighbors, members and newly invited customers will be difficult.

If credit is not limited as the farmers said, "Both the borrowers and the loan organizations will take losses and the farmers will be hurt rather than helped."

Soil Augers — Within the past year we have appraised over a million acres of farm land and thousands of town properties for assessment purposes. The daily comments of the men in the field mapping the soils, and measuring and valuing the buildings, are very revealing.

One of our men met an agent mapping soils from the road. When questioned about the soil type he was mapping he gave the name of the best soil in the county. Actually, it was O'Neill with an underlay of sand close to the surface -- a poor, drouthy soil. Such mistakes are costly.

Farmers respect men who come onto their farms with soil augers and, with sweat and energy, bore for facts -- and don't guess. They slow up our appraisers in their hunger for soil information about the land they farm.

☞ We recommend -- soil augers that get plenty of use on the farms of your borrowers. They command respect and will help prevent losses for both you and your farmer customers.

New Loan opportunities have shaped up in the Farm-Storage program of the government. If your farmer customers need more grain storage this may be the time to get it.

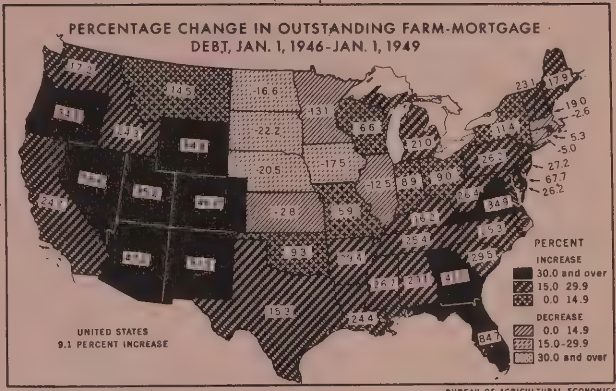
The government will pay farmers 7 cents per bushel storage now for wheat carried under loan or purchase agreement last year. If this wheat is resealed on the farm, the farmer will be paid 10 cents to 11½ cents per bushel, depending upon the area.

That makes a total of 17 cents per bushel on 1948 wheat to establish an equity in new granaries. Farmers must renew loans by June 30th, 1949.

Oats storage for the 1949-50 period is 8 cents, barley 10 cents -- no payment for the past year.

FARM DEBTS INCREASING

The accompanying map shows what has happened to the farm-mortgage debt by states since the close of the war. Debts are up in all but nine states. Large increases have taken place in the western states where land prices dropped rapidly during the past year. That will help cause trouble.



U. S. DEPARTMENT OF AGRICULTURE — BUREAU OF AGRICULTURAL ECONOMICS

WHAT TO EXPECT

All states are expected to have an increase in the farm-mortgage debt during this year -- 1949. All but five states showed an increase last year.

Even though the total debt is still low -- there are many farms and ranches with debts so large that they can quickly default with losses to the lender. Short term debts increased 90 per cent -- since the war.

Expect farmers to shift more of this debt to farm mortgages.

☞ There will be an increasing need and demand by farmers for loans.

Lenders will become more cautious -- as the economy declines further -- and as they see farmers borrowing more.

Land taxes are going up. They are fixed costs that will be hard to pay on low income farms. ☞ Taxes are the FIRST MORTGAGE on land -- don't ever forget that fact -- check taxes before you lend.

More tax increases are ahead to provide the schools and other facilities needed by a growing population.

TO THOSE WHO LEND MONEY

The accumulating evidences of trouble ahead are disturbing.

Major repercussions are traveling in the wake of the terrific economic disturbance caused by the most destructive of all wars. The first collapse from the dizzy heights of the tallest inflation peak in our history may now be developing.

Shifting Gears — Wm. A. McConnell, Pres. of the First National Bank in St. Louis recently told sales managers:

"Our economy is just shifting gears -- changing to a speed which it has a better chance of maintaining. . .It will not amount to a depression unless. . ."

It will indeed be fortunate if in 1949 -- this year -- we can merely shift gears without the economy getting out of control on the down grade.

There are too many businesses catching up with and running ahead of orders. Drops in prices of farm products have caught too many farmers off-guard.

Failure Of Supports. — The country is getting another lesson in the fact that government price supports are not a complete answer when supply and demand get out of balance. Corn selling at $1.00 when there is a $1.43 price support loan shows the tremendous problem that is ahead.

When one big crop, coming when cribs were empty, results in prices far below the supports -- what will happen if big grain crops are produced this year?

Perishables such as eggs, milk and hogs are much more difficult to support than storable grain, cotton and tobacco. ☞ Before you place too much reliance on price supports as now set up -- better go back and review what happened during the war when too many eggs and hogs hit the market. Embargos were placed on hog shipments. Some hogs stayed in terminal yards several days without finding a buyer. Some sold at big discounts after heavy shrink and costly feed bills.

Money, Money, Money ? ? ? Congressmen in the past have warned that price supports depend upon adequate appropriations from Congress. Rules, regulations and support laws will all fail -- IF Congress does not appropriate money as fast as needed and in the amount needed.

Where Store The Stuff? A principal reason why there has been $1.00 corn when support prices were much higher is the lack of storage.

If big grain crops come this year imagine what will happen to prices. Many cribs and bins will already be loaded with a big carry-over.

The purchase agreement plan for grain now in effect provides for delivery of corn where desired. But, try to get some one to store for you. Elevators are either full or dare not risk being plugged with corn when the wheat, oats and barley harvests start.

The proposed government bins will fall far short of providing the storage that will be needed.

These Are Warnings To Both —

☞ Borrowers and
☞ Lenders.

Do not go forward on the blind assumption that --
All is well with the economy, or
Price supports will not fail.
Trouble is brewing that can cause great distress to borrowers and large loan losses.

The Nebraska bankers who last July in their Clinic cautioned against loaning the entire purchase price for feeder cattle and sheep realized that trouble was ahead. Even more severe jolts are yet to come.

A Texas Rancher seeking a relocation interviewed several bankers who told him ". . .while land prices might go down some, they will never return to pre-war levels."

(Continued on Back)

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TO THOSE WHO LEND MONEY

The Economist who reported the concern of the rancher wrote us -- "You are in a position to remind bankers of their responsibility. . .it can not be taken as a foregone conclusion that land prices will not return to pre-war levels. . ."

"Following World War I they went down to less than 75 per cent of prices prevailing during the period 1912-14 and remained at 85 per cent or less for about ten years. . .

"Following World War I, prices paid by farmers for goods and services used in production never went below 120% of 1912-14 price levels.

". . .a much higher percentage of our operating costs are now prime costs.

". . .we may again be faced with embarrassing surpluses of agricultural products. . .it seems likely that farm income will be low and that there will be little surplus income to invest in farm land."

High Risk Areas have again been in the news. Both borrowers and lenders are again taking a severe lesson in how costly it can be to operate in areas where there are major weather or other hazards.

Storm losses have bankrupt some farmers in the past four months. Vast regions of the United States are subject to weather hazards that no lender can disregard. They may result in frozen cattle and sheep in the northern Great Plains and mountains or frozen vegetables and grape fruit and oranges in California, Arizona and Texas.

Excessive feed bills for livestock and loss of flesh and condition or sterility are often more costly than the actual death losses. Note this from a February 1st Texas-U.S.D.A. report "Cattle have shown heavy shrinkage, are generally thin and many are weak. . . losses of new-born range calves were very heavy."

Drouth held a large part of Texas in its grip while winter storms were causing losses in the north. Much of the same areas over which the winter storms have raged are also high risk drouth regions.

Lenders in high risk areas need wide margins of security and special protection such as insurance.

How Much On A Cow? A California banker asked for a more sound valuation process for dairy cow loans.

Dr. Warren of Cornell in New York suggested that the fact that milk cow prices average about 40 times the price of milk might be useful -- "IF they have some forecast of the future price of milk. . ."

Economists in several states call attention to the fact that,

"Prices for the better milk cows are determined largely by the price of whole milk."

Dr. V. B. Hart who has worked so extensively with bankers in the northeastern dairy states says --

"The best answer I have been able to find to this question is the one at which the majority of bankers have arrived, viz., 'sound dairy loans should be based on the operating income of the borrower rather than on cows as collateral'.

". . .In my opinion, any farm loan that is based solely on collateral is a bad loan at the start. Most bank lobbies and offices of Production Credit Associations are not well equipped to stable cows that they might have to take in on a bad loan.

"So I have come to the conclusion, along with a lot of bankers, that the time and energy spent in trying to determine which is the best way for appraising dairy cows might better be spent in appraising a borrower's farm business and the way in which he operates it and handles his personal financial affairs."

Loan Plans are the practical answer to such questions. Each loan officer should have a manual containing a loan plan for each farm enterprise for the area served by the bank or other lending agency.

Under each type, list the efficiency factors that determine profits or losses. They are relatively few in number. Milk per cow; eggs per hen; pigs per litter; per cent calf or lamb crop; and yields per acre of various crops are examples.

These loan plans should be brief "tailor made" procedures for the specific trade area. Such plans will give more loan security AND help guide farmers into more profitable farm management.

ON REQUEST WE REPRINT——

The letter shown below, with the accompanying conclusions, was sent to Digest Clients July 31, 1941. Those who acted on such suggestions have profited far beyond expectations.

Recently we have been urged to reprint this letter. Certainly it deserves study in light of present domestic and World Conditions.

GEORGE WASHINGTON —— Writes a Letter to His Stepson

October 12, 1778

J. P. Custus
__________, Virginia

"A moment's reflection must convince you of two things; first, that lands are of permanent value; that there is scarcely a possibility of their falling in price, but almost a moral certainty of their rising exceedingly in value. And secondly, that our paper currency is fluctuating, that it has depreciated considerably, and that no human foresight can, with precision, tell how low it may get, as the rise or fall of it depends upon contingencies which the utmost stretch of human sagacity can neither foresee nor prevent. . .

"By parting from your lands, you give a certainty for an uncertainty, because it is not the nominal price -- it is not ten, fifteen, or twenty pounds an acre -- but the relative value of this sum to specie, or something of substantial worth, that is to constitute a good price. . .The advice I give is that you do not convert the lands you now hold into cash faster than. . .a certain prospect of vesting it in other lands more convenient requires of you.

"This will, in effect, exchange land for land, for it is a matter of moonshine to you, considered in that point of view simply, how much the money depreciates, if you can discharge one point with another, and get land of equal value to that you sell.

"But far different from this is the case of those who sell for cash and keep that cash by them, put it to interest, or receive it in annual payments; for, in either of those cases, if our currency should unfortunately continue to depreciate in the manner it has done in the course of the last two years, a pound may not, in the span of two years more, be worth a shilling. . .

"It may be said that our money may receive a proper tone again, and in that case it would be an advantage to turn lands, etc., into cash for the benefit of the rise. In answer to this, I shall only observe that this is a lottery; that it may, or may not, happen; that, if it should happen, you have lost nothing; if you should not, you have saved your estate, which in the other case, might have been sunk. . ."

(Signed) GEORGE WASHINGTON

IN 1941 WE SAID

"Economic uncertainty is causing people of all financial strata to seek an investment in land. Some real estate men report the greatest demand for farms by city buyers that they have ever experienced. People are trying in the terms of Washington to secure a "Certainty for an uncertainty". The value of money may depreciate but the inherent value of properly managed land can be maintained.

"But not all land is a "certainty". It is very easy for the uninformed to buy a liability rather than an asset. Many city buyers are so blinded to this simple fact that they appear to have no interest in the location or the condition of the farm. All they want is "a farm" and many have the impression that $15 per acre will buy good land.

"Farms are excellent investments and continue to be the nearest "certainty" known. They must, however, be selected with extreme care. See Digest pages 1005 and 1006. The advice of George Washington was never more sound than now, 163 years later."

IN 1949 the security features of productive land will continue -- but prices are at all-time highs which makes it difficult to make sound investments in farm lands.

TO THOSE WHO LEND MONEY

Those who lend money usually are vitally concerned about the future of land as security for loans. This includes sellers of land where a purchase money mortgage is carried back.

Weak Land -- For 10 years -- on an up market -- confidence has been built into land as an investment -- as security for loans.

All land has gone up in price.

Most farm properties have produced profits -- incomes far above average.

☞ Beware of "cheap lands" as the price squeeze progresses.

Taxes are going UP
Prices of products are going DOWN.

Operating costs are going UP
Incomes are coming DOWN

Large acreages of the cheap lands of low productivity will again become liabilities instead of assets. Taxes and other expenses will rise above income. They will be weak security for loans. See Digest page 1007 and read again Page 50, dated Nov. 15, 1948.

Evidence that weak lands are moving up more rapidly in price than the good lands is contained in the North Central Regional Publication 11. Request it from the northern midwest agricultural colleges -- ask for "Farm Land Prices".

From 1942 to 1946, price changes by land types are reported as:

Corn Belt	-- up 40 %	Smallest increase
Cotton	-- up 51 %	
Cutover	-- up 83 %	Largest increase
Ozarks	-- up 107 %	
General Farming	-- up 63 %	

"Land Boom Storm Signals" by Dr. W. G. Murray of Iowa shows that in 1947 -- "fair to poor land went up slightly more in proportion to the other grades."

"This rapid rise in the price of fair to poor land is a danger signal that we will want to keep our eye on."

"Yard Sticks for farm lenders" is the title of a mimeograph work sheet by Purdue University, Lafayette, Indiana. Although it is based on Indiana conditions, it illustrates the factors that every lender should now be using to discover the weak loans.

Simple score cards for each major type of farming should be in use by banks and other credit agencies. They should be designed for the specific areas where loans are being made. Risks can be measured.

"We Share the Thought that farmers should be free agents in running their farms, but where a farmer must go in debt to buy an expensive piece of farm machinery, counsel, not dictation, from his banker can help forestall unwise purchases that might later be regretted.

"In-so-far as new machinery is available for purchase, we would counsel purchase of the particular machine that over the year would save the most labor and we'd stress that the saved labor should off-set the purchase price in the short-term future." (Fed. Reserve Bank of Boston).

The First Lien on the income of a farm is the living expenses of the family. They are high and will stay up. Next come taxes, operating expenses and replacements that cannot be put off.

Interest and principal payments on a farm loan are "only about a third or fourth lien on the farm income," according to Dr. V. B. Hart of Cornell University, New York.

☞ Making sound loans for the future depends more upon determining how well the income of the farmer will hold up than upon the value of the security.

Dr. Hart, in speaking before Bankers and PCA managers, makes such statements as these:

"Some farm loans now on the books that are self-liquidating with present prices could not be repaid out of operating income with prices that have prevailed over the years.

"Our PCA system was born at the bottom of a depression but has never ridden the price-level toboggan down into one.

"A sound farm credit program means lending courageously when the general price level is low and with increasing scrutiny of loans when it is high -- and it is high now.

"Violent changes in the general price level of this country have made and broken more farm families than any other economic factor."

QUARTERLY RELEASE

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TO THOSE WHO LEND MONEY

Big Crops are setting in motion a whole chain of reactions that will increase during the months ahead. These crops will come onto peace time markets, three years removed from the close of the war. These reactions will quickly affect the stability of many loans to farmers.

For example, look at some of the far reaching effects of a 15 million bale cotton crop. Most of the weight in cotton as picked is in the seed -- not in the lint.

Oil from cotton seed is directly competitive with soybean oil. The 15 million bale cotton crop will jolt the price of soybeans.

Oils compete with fats like lard. The 15 million bale cotton crop has already helped drop lard prices. Cottonseed oil will be a factor in bringing down the price of hogs and other livestock.

Protein meals and cake from cottonseed compete with other protein supplements. Through soybean meals the price of soybeans will be further affected. Through tankage the price of hogs and other livestock will receive pressure. Alfalfa meal prices will decline and thus alfalfa growers will be affected.

Peanut and flaxseed growers get the depressing effect on their prices as they produce both oil and protein meals.

More cotton lint puts pressure on other fibers including wool.

☞ This is enough to indicate that lenders need to be alert to the far-reaching effect of major changes in production wherever they occur.

Livestock Prices within less than a year will be responding to the competition of lower priced crops and crop products.

More liberal feeding and the rush back into chickens and hogs will be bringing more meat into the markets. Also more meat substitutes like milk and eggs will be produced.

☞ It is not too early to begin rechecking those farm loans and livestock loans where the repayment is dependent on the livestock income.

Support Prices are a useful guide to the ability of borrowers to meet loan payments during 1949. Do not overlook how they operate.

Much wheat and oats have been selling below support levels even this year. Corn is now being contracted at country elevators in the corn belt at prices of $1.25 per bushel which is 15 to 20 cents below the expected support price. Often these lower priced sales are to get cash to pay bills and meet loan payments.

Thus those who need the income most often get the lowest prices -- and less than the support prices.

Eligibility and storage requirements are being tightened up. They can be further restricted to discourage use of the price supports.

Perishable products like livestock, poultry and eggs are very difficult to effectively support when large quantities come onto the market. In considering the security for your loans by price supports, do not forget the hog and egg price debacles that came when there were heavy marketings regardless of the huge war demands.

C.P.A.'s are watching more closely the basis for their loans. Alert managers will be aware of the fact that they will no longer be lending on a constantly rising market.

One Secretary-Treasurer in a letter says -- "We like your material very much . . .I would like to 'shoot from the shoulder' on the dangers of doing business on too much borrowed money, even harder than I have seen in any of your releases."

Yes! price supports are a guide -- but allow a margin of safety, especially where perishable products are the source from which loan repayments must come.

A New Price Alignment is being ushered in by the big crops of this year. Watch the developments and look ahead to how your loans may be affected.

More and more bankers are reporting that they have all the loans they want. As one banker said in a meeting, "We now prefer to see customers come into

(Continued on Back)

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(Continued from Front)
the bank on business other than that of securing a loan or a further extension of credit."

Many bankers, for example, will be lending less on cattle and lamb feeding, than the traditional loan of all the purchase price, where a farmer has or can buy all the feed.

Life Insurance How Much? Those who lend money have an interest in the life insurance program of the borrower. It may be even more important than the insurance on the buildings, equipment and other physical property. The borrower is vital in the repayment of loans -- his death a frequent cause of trouble.

The Missouri College of Agriculture has outlined the life insurance needs of a farmer with statements such as the following.

First -- all through life a farmer needs life insurance to provide the family with enough money to pay the doctor, hospital and funeral expenses at the time of death.

Second -- the farmer should have life insurance to provide the family with enough money to pay off all debts in case of death.

The college suggests that farmers should not have debts after the age of fifty.

Third -- the life insurance should provide the family with an income when their earning power is low. That responsibility is big from age thirty to fifty and then normally ceases as the children reach maturity.

Some such guide should be used in advising farmers about their insurance program. See also Digest pages 596.1-2.

The Dreary Thirties -- "when public opinion of banks was at zero level", caused "Dick" Trefz, now President of the Beatrice, Nebraska State Bank, to do the basic thinking that has given the Bank and Beatrice --

☞ A COMMUNITY ROOM

We heard about it at the Nebraska Bankers Clinic and we asked Mr. Trefz to give us further information to pass along to you. Here it is from his letter.

"I learned long ago that it did not require a banker to lend a farmer who has a half section of choice farming land clear. A man that had the sense and ability to acquire that much was in all likelihood a better manager than the rank and file of our country bankers are today.

"So, in my desire to reach out for this other group of people, I found myself continually handicapped by the lack of proper facilities to take care of them.

"I used to bring a group of people into Rich Hill, Missouri but the only place available then was the High School gymnasium. This was too large for a small group and lost its intimacy.

"In the meantime I migrated to southeast Nebraska. The first few years required all of my time and energy to establish ourselves, but I had never forgotton this remote goal of community service.

"So, two years ago when things were fairly well established, I proceeded to excavate under our banking quarters and transform it into a Community Room which will comfortably accommodate seventy-five people, but it will hold as many as 110.

"The room is fully air conditioned which makes it very pleasant in summer as well as winter.

"Our Room is available to any non-profit, service institution without any charge whatsoever. It is booked on an average of two or three nights or afternoons a week. The League of Women Voters, the Farm Bureau Federation, the Dairy Breeders Association, and numerous farming groups use it regularly.

☞ "Of course, primarily we want our Community Room as a medium to bring the bank closer to its people.

"With the addition of a second college-trained, full-time Agricultural Consultant we expect to develop an extensive education program with the participation of our Agricultural College.

"The fittings of the Room are simple. The walls are executed in plywood with a light stain. The ceiling is acoustically treated. The chairs are comfortable -- of the folding type. An electric hot plate, a small buffet, and sink allow the preparation of coffee and a snack."

More and more businessmen want to render a SERVICE to farmers. They need only to be shown practical ways.

COMMANDMENTS TO COUNTRY BANKERS*

The managers of your clinic assigned this subject. Therefore if you draw any inference that bankers need commandments, blame your leaders - I am following instructions.

I have had much help in writing these commandments. In response to a brief note in our Digest, came suggestions from New York to California by farmers, businessmen, teachers and bankers. One implement dealer whose "dad and uncle were both bankers in their day", at the end of many fine suggestions wrote, "I hope you give them hell - they need it". The reactions we get regarding bankers are a mixture of fine respect, appreciation for the difficult job you have to do and a definite desire for changes that the public would like to see made in banks and in the way they are run.

COMMANDMENT NO. I Beware the changing times.

Seven years of increasing prices have lulled many into a false sense of security. It requires comparatively little effort to make money on an up market - especially when it develops into a war boom. The acid test is ahead. What will happen to you in the treacherous days that are before us. How well will your customers survive?

The most important fact which we need to keep before us now and for the years ahead, is the behavior of prices of farm products during and following wars.

Extreme price inflations accompany major wars. The period of inflation is short compared with the prolonged period of deflation. The inflation episodes last only about three or four years -- it has been longer this time, due to a longer and more destructive war -- whereas the deflation period apparently runs 30 to 40 years.

The price behavior during and following each major war in which this country has participated has been essentially the same.

War of 1812
Civil War
World War I
World War II

The graph on the Doane Agricultural Digest Page 19, shows the effect of wars on prices of farm products; it is the best index we have of the road that lies ahead.

Following World War I over 50% of the banks in the United States suspended operations - 57% of Indiana banks passed out of existence.

Your secretary Mr. Cook wrote us, - "We had 16 banks in the county before the depression, with 5 now."

COMMANDMENT NO. II Do not accept business that you are not willing to see through times of stress.

Times are prosperous now and there is a scramble for customers. Most borrowers can meet interest payments now. That appears too often to be the primary basis of deciding whether to accept a new loan account during these times of idle and low yielding money. But what of the day when the going gets tough for folks who have extended their operations because they could borrow from your bank. Will you call their loans or force partial liquidation to protect your loan regardless of the loss to the borrowers?

Banks have rapidly taken over an increasing proportion of the farm mortgage loan business. Now, commercial banks handle about 30% of the loans compared with a little over 18% following World War I. Insured Commercial Banks now have about 10% of the total farm mortgage debt in contrast to about 6½% 10 years ago. There is evidence that the mortgage loans being made by banks include many of the highest risk loans. Will you keep faith with even the highest risk customer you are accepting now and see him through the next depression? If, in doubt about your willingness or ability to do so, I challenge your moral right to accept such customers when times are good and thus encourage their high risk operations.

NO. III Make operating loans only on a basis that permits and requires repayment out of income.

A great dis-service can be done to your bank, your farmer borrower and to your community by making operating loans that cannot be repaid out of income. The mere fact that there is adequate security in the form of chattels is not enough. If a bank does not collect the loan out of farm income and is forced to either take over livestock and machinery or force the sale of such chattels, it can be poor business for the bank, the farmer and the community.

Enough controlling farm management standards are known, to serve as tests as to the soundness of any farm operation. These should be applied to applicants

(Continued on back)

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*Address before AGRICULTURAL CLINIC, Indiana Bankers Association and School of Agriculture, Purdue University, March 21, 1947 by True D. Morse, President, Doane Agricultural Service, Inc.

seeking operating loans to determine the probable ability of the borrower -- to repay the money with interest out of the farm income.

NO.IV Have a sound working knowledge of basic farm management principles.

This should extend to all major types of farming served by your bank. What controls the success or failure of each? What are danger signals to be watched? The ability to offer sound financial guidance based on an understanding of farm management can be of tremendous value to farmer customers and the farming business of your area as well as contribute to a more profitable bank business.

Dr. V. B. Hart of Cornell University who serves as advisor to bankers states, "Although conditions vary over the country, it has been found that in general the six most important factors affecting farm incomes and over which the farmer does have some control are:

Size of business
Production per animal
Crop yields
Labor efficiency
Diversity of business
Quality of land."

We strongly recommend the type-of-farming approach. In the area served by a bank there are various combinations of farm enterprises which give each farm a characteristic type-of-farm. In Indiana they are referred to under such names as,

Dairy Farms
Dairy-Poultry Farms
Cash Grain Farms
General Farms
Corn-Hog Farms
Tobacco-Livestock Farms
Fruit Farms
Self-Sufficing Farms
Part Time Farms

To a farm manager and rural appraiser who has never been a banker but who has borrowed from banks for farm operation and helped thousands of farmers work out their financial problems, it would seem that a first requirement of every country banker would be complete loan plans for each major type of farm in the area served by the bank. A simple loose-leaf handbook could be started with at least one sheet for each major farm type. Under each type list the efficiency factors that determine profits or losses. Your college of agriculture is constantly developing such information and will gladly make it available. Use it. Have it at hand in quick reference form.

Each type-of-farm sheet should show the break-even points based on your soils, climatic conditions and markets. With such work-data constantly at hand, you will know when danger points are being approached by price trends.Before Claude Smith gets into trouble with his cash-grain farm loan you can visit him at his farm and plan with him changes that may be necessary to protect his business as well as your bank.

Take your handbook along. Let him see the factors that control the profits of his business. Point out what the Agricultural College data show. It will convince Claude that you know farm finance and how important it is for him to have your bank helping him guide his business operations.

NO.V Make farm loans on terms that fit the type of farming carried on by the borrowers.

Several years ago I participated in the Bankers-University Conference in Missouri. In preparation for the meeting I had some questionnaires sent out to banks. One incidental question at the end brought startling information. Regardless of the type-of-farming, or the time of year, loans were being made for 3 to 6 months in most cases. Apparently no effort was made to mature the loan when it could logically be paid. A wheat farmer got a 6 months loan even though he might not be selling his wheat for 8 months. A hog farmer got a 3 or 6 months loan regardless of when his hogs would be ready for sale.

I realize progress has been made since 1940 but one former Ohio banker sent in this statement:

"Have you bankers changed your tactics in the past 50 years? Do you still set up 60 to 90 day notes for agricultural purposes? It takes 6 months to feed out a litter of pigs, 9 months to grow a wheat crop and 2 years to produce a feeder steer. Set up your notes so they come due when the borrower can pay."

You can give a lot of valuable farm management guidance to your farmer customers just by correctly setting the interest and principal payment dates.

When you make a loan to Mr. Hog Farmer, at what date should you make his loan come due? Will you set the maturity for December when most farmers sell their hogs at the lowest price of the year? Or will you show Mr. Farmer the graph in your handbook and plan with him to keep the spring pigs on self feeders, in lush pasture, with free access to salt and mineral mixture as recommended by Purdue University so the hogs will be ready to sell by September? If you do the latter, and set the loan maturity for October 1 you will have guided your customer into more profitable farm management. Your loan will be more certain of payment in full and on time.

With loans handled on this basis you won't need to worry about competition. The old principle that if you make a better mouse trap the world will beat a path to your door still holds true

(Balance of commandments will appear in

COMMANDMENTS FOR COUNTRY BANKERS

Continuation of address before AGRICULTURAL CLINIC, Indiana Bankers Association and School of Agriculture, Purdue University, March 21, 1947 by True D. Morse, President, Doane Agricultural Service, Inc.

For first part of address, see Page 1053 released in June.

COMMANDMENT NO.VI Put dirt farmers on your Board of Directors.

The term "dirt farmers" is used in an effort to distinguish between farmers and merely land owners. Farmers know the difference. You want men who are out on the farm and working among farmers day after day. Here are suggestions that have been offered.

Have as many farmer directors as the proportion of your total farm business represents.

Both younger and older farmers should be on the board.

Make selections so that each major type-of-farming will be represented.

See that each major farming area is represented by a farmer director.

If you cannot immediately work out such full representation on your present board, a New York man suggests making up an advisory board of capable farmers.

NO.VII Have practical, inviting buildings and facilities to make farmers feel at ease.

It would appear that too many bank buildings have been designed as monuments - cold granite and marble monuments to their officers. It is an important reason why farmers are "Banker Shy".

Farmers are accustomed to the informal, inviting open country - "don't fence me in". They are practical and have a natural reaction to the hard,cold lines of the huge corridors of banks. The counters, grills and fences - fence the farmer out rather than invite him in.

The First National Bank of Cortland, N. Y. has an Agricultural Department which farmers can reach without having to enter the main part of the bank - "The Marble Palace Part". Here, the farmer doesn't have to take off his boots and put on good clothes in order to feel at home. It has paid off in increased farm business.

A Kansas man says, "Modernize your interiors - get rid of 1875 walnut carvings. Give your customers a place to sit down while waiting."

A Michigan farmer wants "a comfortable office where farmers can sit with boots on and talk over their plans."

NO.VIII Be Human

This applies to the entire bank personnel. Here are typical statements that have come in:

"Quit being so important to yourself -- particularly employees."

"Get out on the farm, look at the cows, the hogs, the crops and the kids with the farmer."

A vocational high school instructor down in Oklahoma lists among his commandments for country bankers - "Do not overlook future bank prospects - look to the boys and girls in high school as your future customers."

"Be a common fellow - let your hair down and be human." Most borrowers according to this instructor are - "afraid of bankers."

"Let the banker get off his imaginary pedestal."

A Minnesota banker agrees that the question, "Why are farmers 'Banker Shy', is a vital one to every rural banker."

A Federal Reserve Bank representative states, "No small part of my efforts at this institution are directed to stimulating bankers to become down-to-earth living parts of their agricultural communities."

The Federal Reserve Bank of Boston writes, "Our own reaction is that established farmers will patronize credit sources that they respect, that are convenient, that are friendly, and most of all, that understand agriculture. -- And when to this quality is added an inclination to mix, to get out among farmers and to seek farm business, then the banker is well on the way to earning the reputation, nice in its old -fashioned sense, that his is a 'farmer's bank'."

NO.IX Educate the people on how a bank operates.

This is the advice of an instructor -- let people know why a banker must have good security. He feels the same as Mr. M. H. Cook of the Fountain Trust Company of Covington,Indiana, who wrote, "We are lending 'trust money'. Our first obligation is to keep our depositors' funds so that he can get them. I believe lending money is also an obligation but in so doing I should always have uppermost in my mind that, 'it is not my money'."

Yes! Educate the people on how a bank works. Meet especially with the farm club boys and girls. Invite the classes to visit your bank. Do more than invite them - insist that they come and perhaps hold a class in banking in your directors' room.

COMMANDMENTS FOR COUNTRY BANKERS

NO.X "Country bankers should keep well-posted on all farm and commodity prices in order to be in a position to advise their borrowers."

How I delight to quote this Commandment taken from "The Missouri Banker". My friend William R. Courtney, President of the Mexico Savings Bank in Mexico, Missouri, was one of the committee. Several years ago I had a prominent banker stand up in a meeting and tell me in no uncertain terms why a banker should never offer marketing advice to farmers. If you do not do so, don't blame the farmer if he goes across the street to some competing financial agency that is ready to sit down with him and supply information and advice. One farmer expresses this commandment thus, "Thou Shalt Not Commit Ignorance."

The statistical position of farm products is changing constantly. These changes do not come unannounced. Usually months in advance information is available indicating trends. Price trends cannot always be predicted, but certainly there is no excuse for not making full use of the facts that are available.

NO.XI Work into your staff, an agricultural college trained man, and train him as a possible future officer.

Not all banks can afford a full-time outside man on the farm business, but any country bank can have a technically trained agricultural man on its staff.

NO.XII Quit fighting the Production Credit Association.

The man offering this advice says, "Use the energy going after the business that neither you or the P.C.A. has."

Another became very pointed in saying "Get on your feet and lead in financing the farmer. If you don't, the government will."

NO.XIII "Bankers must assume the unliked position of being a 'kill-joy' to stave off the aftermath of this last minute speculation."

The Iowa farmer sending in that commandment had the same concern that was expressed in the last Newsletter of Banking.

"Many good moral risks applying for GI farm loans will still lack necessary experience and owned capital. Desire to 'help boy out' plus protection offered by government guarantee will mean big temptation to make loans that are safe for bank but dangerous for veteran; especially true where banker lacks knowledge of farming. Experience indicates when veteran goes broke on loan of this kind and finds out bank was covered by government guarantee but he still owes the Government, he throws dead cat back on the doorstep of 'that banker who got me into it. Enough of this type loan has already been made to serve as a warning'."

NO.XIV Sell Government Savings Bonds to your customers in a never ending campaign while inflation lasts.

Dr. Hart of Cornell University points out that savings bonds will give your farmers a good credit standing for the future. "Load them up for their good." When they need money many of them will hold their bonds and borrow from your bank.

Fixed dollar assets that will not shrink in value like cattle, wheat or land, will grow in purchasing power when prices decline. Jim Burch, Director of Extension at Missouri University advises farmers that U. S. Savings Bonds are the "best hedge against falling prices."

John R. Ellis, Assistant Vice-President of the Security Trust Company of Rochester, Pittsford N.Y. sent 10 "Bankers Commandments" that he has had in his possession for many years. Those that follow are quoted from his list.

NO.XV "Thou shalt have no other business take precedence over thy bank.

NO.XVI "Remember the laws of sound economics to keep them sacred, for thou canst no more violate them than the laws of gravitation without hurt to thy bank and its depositors."

NO.XVII "Thou shalt not commit the making of loans to the judgment of one officer; no, not even on holidays."

NO.XVIII "Thou shalt not covet 'the biggest bank in town', remembering that 'He profits most who serves best', and that 'pride goeth before a fall'."

CONCLUSION

There is clear evidence in these Commandments that farmers want their bankers to be outstanding community and financial leaders, yet men who fully understand their problems and who are one of them. They don't want you withdrawn into marble palaces and behind barriers that fence you in and fence them out.

It is because they idealize your job so much that they have so liberally suggested high standards to which you should measure up. They want top ability so they can depend on you- especially when trouble comes.

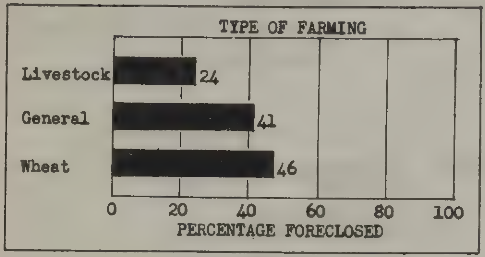
You have a hard job and much responsibility. Since you are traditionally looked on as leaders, your opportunities for community development are tremendous if you furnish wise and agressive leadership. If you are not progressive and fully abreast of the times you can keep a dead hand on the community that may cause it to decay. It is far easier for me to give you these commandments than for you to live up to them.

CREDIT RISK FACTORS

A detailed study of farm mortgage loan experience in Central Montana reveals some of the important factors associated with good and bad loan experience. Although especially applicable to western territory many of the results correlate with findings in central and eastern states and thus evidence is contributed to the fact that some of these are controlling elements in making safe loans regardless of the territory. The data of the study cover the years 1911 to 1937.

Type of Farming

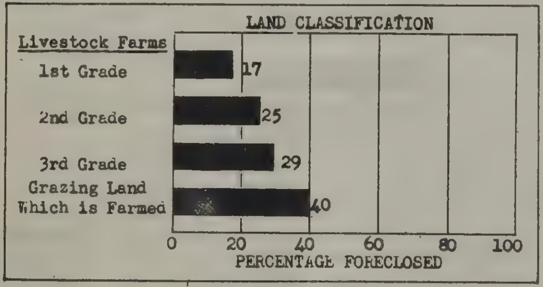
Type of farming is a factor and no loan plan is complete that is not fully adjusted to this feature.

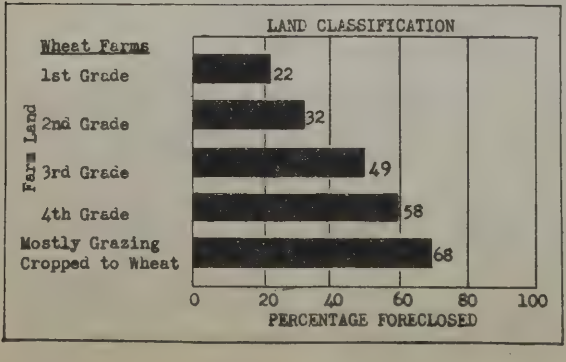


These results do not necessarily condemn or approve any particular type of farming but show that this is a factor to study for each loan territory. In this case one type of farming had almost twice as many foreclosures as another in the same territory (percentage basis).

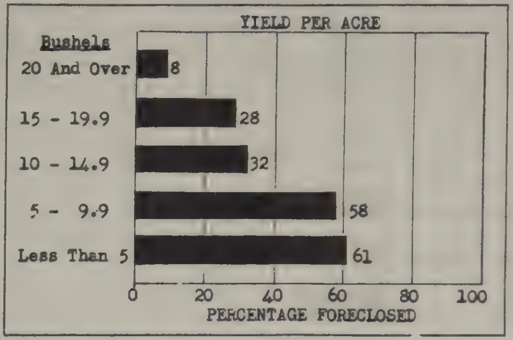
Land Productivity

Good loan experience is strongly and directly related to high productivity. (See Digest page 559) This is a relative matter that operates within areas according to land use. As in this case no doubt low grade wheat land if used for grazing might have classed as first grade grazing land.



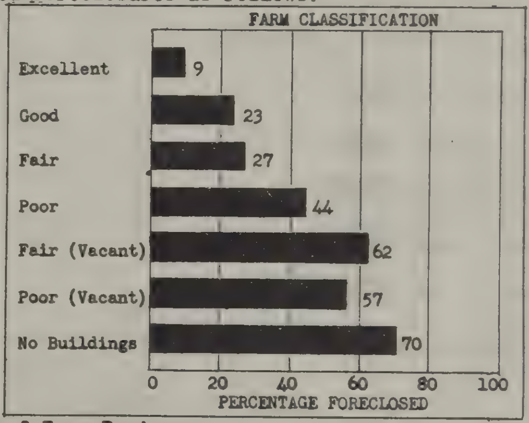


The study again presents evidence of the tendency to under-appraise good land and over-appraise poor land.



Improvements and Other Visible Conditions

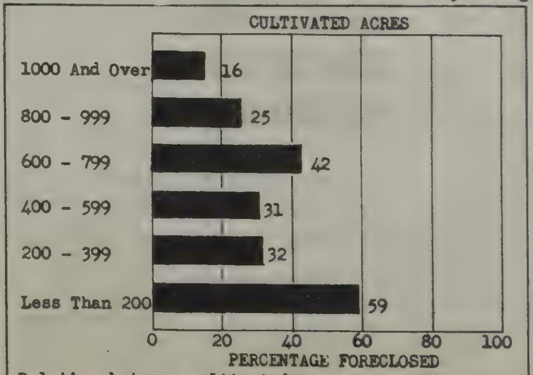
Research in various regions shows that the condition of buildings and various improvements and conditions shown by other visible features are strong evidence of credit stability. This is a further reflection of productivity. In this study the farms, when classified by condition and size of buildings and any other visible evidence of the condition of the farms showed foreclosures as follows:



Size of Farm Business

Farm management and other studies have for years emphasized the importance of size of the farm business from the standpoint of obtaining a satisfactory farm income. The larger family size farms pay better labor incomes than the smaller farms in most regions and under normal conditions. Size of farms and of the farm business should not be overlooked in setting up farm loan programs for any region. This factor varies by type of farming, land productivity, and other features all of which must be properly related.

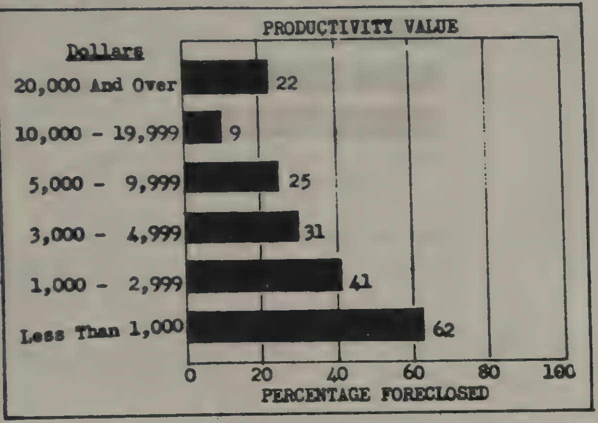
Equipment, size, and adaptation may account for the variation of the 600-acre size shown by the graph.

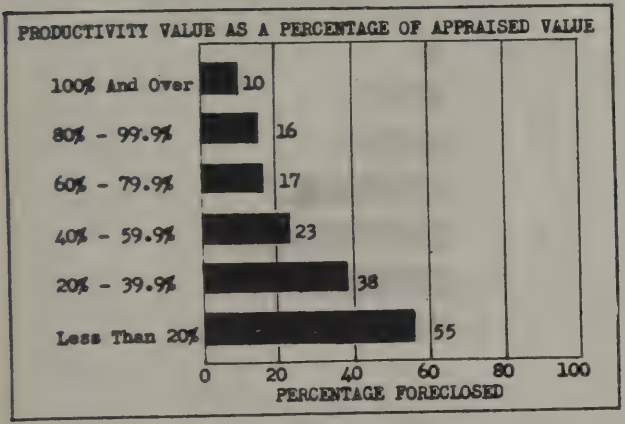


Relation between cultivated acreage and foreclosures on wheat and general farms.

Income Capitalization Value

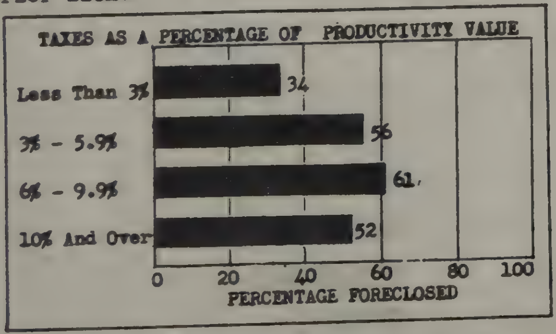
The American Rural Appraisal System places great stress on the importance of showing separately that portion of the Basic Value of a farm flowing from earnings. That this is especially important in making farm loans is shown by the results of this study. Witness the accompanying graphs.





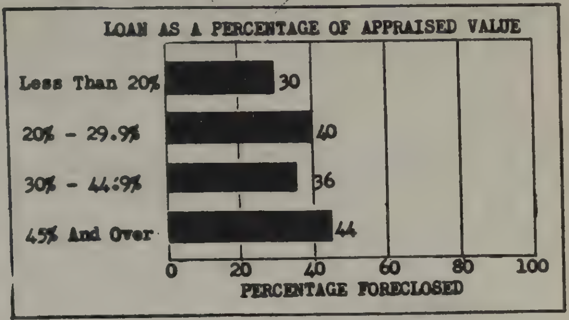
Taxes

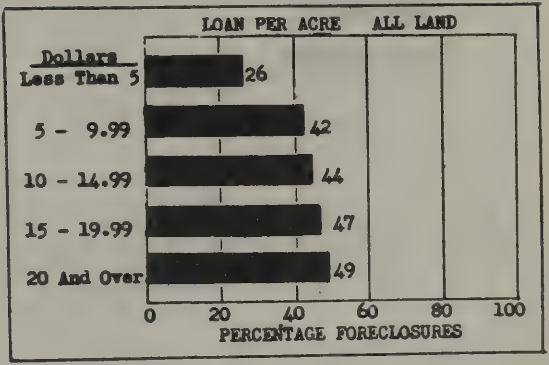
Taxes compete directly with interest and principal payments and normally cannot be long deferred as is the case with many other farm costs. They must also be paid in cash. They are a prior lien.

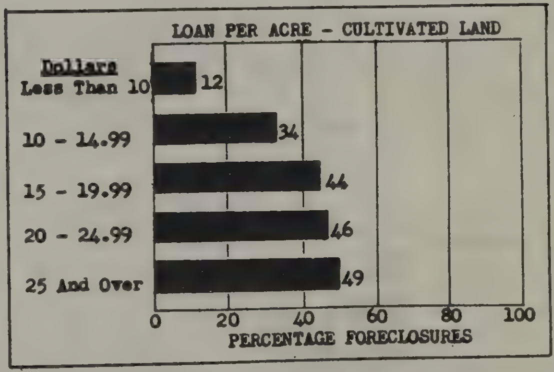


Loan As Per Cent of Appraised Value and Per Acre

In the past there apparently have been more important safety factors than the percentage of loan to appraised value. More accurate appraisals in the future may make this a more dependable feature. However, there is strong evidence that loan security may depend primarily on loan plans that are adapted to the region and that include controlling risk factors such as are herein discussed. (See also other Digest pages such as 121-122, 521, 559-561.)







The accumulating research evidence from a number of states shows that every bank, insurance or loan company undertaking to make farm mortgage loans should do so only after working out complete farm loan plans adapted to the specific area in which the loans are being made. This involves careful mapping of the loan territory.

Every loan should be subjected to a loan analysis to show to what extent the controlling risk factors are favorable.

Such procedure coupled with complete and up-to-date appraisals will not only insure fewer loan losses for the lending agencies but loans adapted to the needs of the borrowers.

There is little if any excuse for lending organizations failing to make full and systematic use of such available information and modern methods.

Bulletin 372, Montana State College
Agricultural Experiment Station

COOPERATIVE FARM CREDIT

WHERE TO FIND IT -- HOW TO USE IT

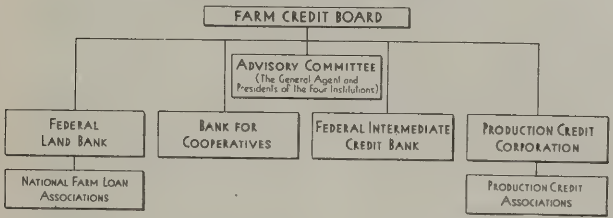
Most loans are made to buy farm land, refinance existing debts or for production needs. Loans made to buy farm real estate are necessarily long-term. Those for production needs are intermediate or short-term.

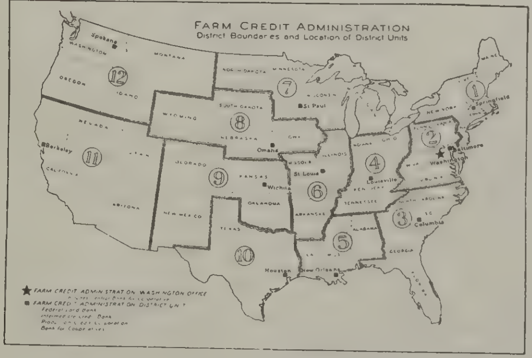
The two sources of farm credit are: (1) Private, (individuals, banks, insurance companies and merchants) and (2) Public (Federal Land Banks, Production Credit Associations, and Farmers Home Administration, etc.)

Farm credit it more difficult to provide than other business credit. Surplus funds that could be invested in farm loans are usually located in the cities away from the farming areas. The main problem is to make the city investors' funds available to the widely scattered farmers.

As early as 1916 Congress was aware that private sources couldn't supply all the kinds of credit needed by farmers and passed the Federal Farm Loan act. By March of 1917 the 12 Federal Land Banks began operation.

ORGANIZATION OF THE
TWELVE FARM CREDIT DISTRICTS


FARM CREDIT BOARD
ADVISORY COMMITTEE (The General Agent and Presidents of the Four Institutions)
FEDERAL LAND BANK
BANK FOR COOPERATIVES
FEDERAL INTERMEDIATE CREDIT BANK
PRODUCTION CREDIT CORPORATION
NATIONAL FARM LOAN ASSOCIATIONS
PRODUCTION CREDIT ASSOCIATIONS


FARM CREDIT ADMINISTRATION
District Boundaries and Location of District Units
1
2
3
4
5
6
7
8
9
10
11
12
Spokane
Springfield
Baltimore
Washington
Columbia
Louisville
New Orleans
St. Louis
St Paul
Omaha
Wichita
Houston
Berkeley
FARM CREDIT ADMINISTRATION WASHINGTON OFFICE
FARM CREDIT ADMINISTRATION DISTRICT UNIT
Federal Land Bank
Intermediate Credit Bank
Production Credit Corporation
Bank for Cooperatives

In 1923 the Federal Intermediate Credit Banks were established. In 1933 the Bank for Cooperatives and the Production Credit Corporations were set up. In 1933, these farm credit agencies were all grouped together under the supervision of the Credit Administration.

FEDERAL LAND BANKS

The Federal Land Bank system is the major source of public long-term farm credit. Loans are made through the National Farm Loan Associations, local cooperatives organized by farmers desiring long-term credit. At the end of 1952, the system had 311,800 loans outstanding for over a billion dollars of unpaid principal. Of these loans, payments on 95.4 per cent were fully current.

Farmers may borrow to buy farm land, to build farm buildings, to clear, drain or level land, buy livestock or to refinance existing debts. The Land Bank makes amortized loans which can be paid off over a period of years.

Funds Loaned come from private investors who buy F.L.B. bonds and from interest received on mortgage loans. The Land Bank system is completely farmer-owned through the N.F.L.A. and does not rely on government funds for operation or loans. It is best described as a farmer's cooperative under supervision of Farm Credit Administration.

To Get A Loan apply through your local national farm loan assocition. An association representative, usually the secretary-treasurer, investigates the farm and your credit standing. The application is then forwarded to the Land Bank with the recommendation of the association. A Land Bank appraiser inspects your farm and makes his report to the Land Bank.

On the strength of these two reports the bank loan committee approves or rejects the loan. If your loan is closed you become a member of the loan association, and must become a stockholder equal to 5 per cent of the loan. Basic interest rate was 4 per cent through 1952 except in three east coast F.L.B. districts.

PRODUCTION CREDIT ASSOCIATIONS

The Production Credit Corporations supervise the local P.C.A.'s in making short-term loans to carry on farm production. This means loans to buy feed, seed, fertilizer, chemicals, fuel, building supplies, fencing, machinery, livestock, baby chicks, labor and professional services, rent, taxes, and property insurance.

During 1952, the 499 PCA's made 279,500 loans for $1.3 billion -- the largest volume of credit in their history. The credit corporations, unlike the land banks, do not operate entirely on private investment funds. They obtain their loan funds from the Federal Intermediate Credit bank.

The Production Credit Corporations were originally set up with a $120 million government investment. Today this has been reduced to $36.2 million. The eventual goal of the PCA's is to retire all Government capital.

DOANE AGRICULTURAL DIGEST ® MAR., 1953
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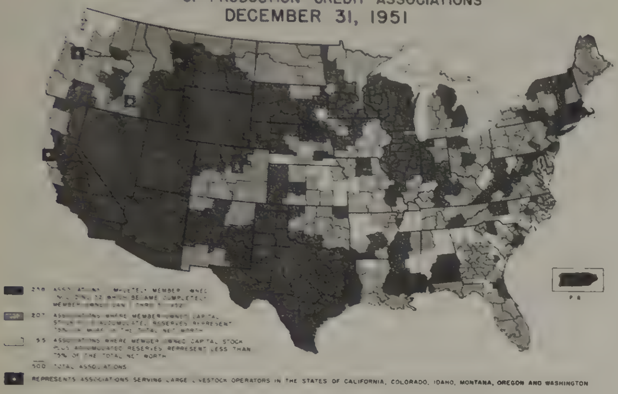
GOVERNMENT FARM CREDIT

PROGRESS IN MEMBER OWNERSHIP
OF PRODUCTION CREDIT ASSOCIATIONS
DECEMBER 31, 1951


238 ASSOCIATIONS WHOLLY MEMBER OWNED
207 ASSOCIATIONS WHERE MEMBER-OWNED CAPITAL STOCK PLUS ACCUMULATED RESERVES REPRESENT 75% OR MORE OF THE TOTAL NET WORTH
55 ASSOCIATIONS WHERE MEMBER-OWNED CAPITAL STOCK PLUS ACCUMULATED RESERVES REPRESENT LESS THAN 75% OF THE TOTAL NET WORTH
500 TOTAL ASSOCIATIONS
REPRESENTS ASSOCIATIONS SERVING LARGE LIVESTOCK OPERATORS IN THE STATES OF CALIFORNIA, COLORADO, IDAHO, MONTANA, OREGON AND WASHINGTON
P.R.

FEDERAL INTERMEDIATE CREDIT BANKS

The Intermediate Credit Banks were set up to provide local farm lending agencies with a dependable source of credit. All stock in these banks is owned by the Federal Government. Loanable funds are secured from short-term debentures sold largely to banks. Most loans are made through the local PCA's but country banks and livestock loan associations can also use the bank's services. Funds become available to lenders when the FICB purchases and discounts their agricultural notes. These banks make no direct loans to individuals nor do they accept deposits.

BANKS FOR COOPERATIVES

Most cooperatives operated for the mutual benefit of farmer members may borrow money from the Bank for Cooperatives. Loans can only be made to farmers acting together for one of the following purposes;(1) processing or marketing farm products, (2) purchasing and distributing farm supplies, or (3) furnishing farm business services.

Stock of these banks is largely government owned. In addition to the capital supplied by government, all cooperatives which borrow from the Bank for Cooperatives are required to own capital stock in the bank.

The banks make three types of loans; (1) Short term commodity loans (not over 12 months) secured by a lien on farm products held by the cooperatives. (2) Operating loans which are not always secured -- either short or medium term loans, and (3) Facility loans which must be secured, cannot exceed 60 per cent of the appraised value of the cooperative's collateral. These are long-term loans but usually run for less than 8 years.

GOVERNMENT FARM CREDIT

The Commodity Credit Corporation, Farmer's Home Administration, and Rural Electrification Administration are other sources of farm credit separate from the F.C.A.

The Commodity Credit Corporation has little direct contact with the individual farmer but is the real power behind all crop support loans. The CCC stands behind crop loans made by banks or other lending agencies for crops stored under the support program.

The price-support program loans and inventories totaled almost $2.5 billion as of December 31, 1952. The bulk of these loans were made for wheat, tobacco, corn and cotton. Outside of these four crops, the largest loans outstanding were wool, amounting to $43,348,032. Other loans outstanding covered everything from flaxseed to honey.

The CCC is authorized to have total borrowings outstanding of 6.7 billion to carry on its various programs. In event it were needed the CCC could more than double the amount of credit it now extends.

The Farmer's Home Administration is the rehabilitation arm of Government farm credit. At the time the loan is made, the farmer must have a low income and be unable to obtain other credit to suit his needs. When the loan is repayed the farmer is expected to have a satisfactory income and be eligible for loans from other credit agencies.

To qualify for an FHA loan farmers are required to have sufficient land to support their family and repay the loan under normal conditions. The loans are largely direct advances from the Federal Government obtained from annual appropriations made by Congress. Repayment is returned to the Federal Treasury. During 1952, 235 thousand farm families were using $545,627,510 in loans from the FHA.

The F.H.A. makes four types of loans, (1) operating, (2) farm ownership, (3) farm housing and (4) disaster. The operating loans are secured by chattel mortgages and are made at a 5 per cent interest rate.

The funds for farm ownership loans are both Federal and private funds -- banks and insurance companies sometimes furnish funds to F.H.A. for these loans. Interest rate on these is 4 per cent.

The farm housing loans are for home improvement -- for items such as new water systems, central heating, and remodeling, Interest rates on farm housing loans are at 4 per cent. Disaster loans for flood, drouth and other emergencies are at 3 per cent interest. Funds for both disaster and farm housing are from Government appropriations.

The Rural Electrification Administration was organized in 1935 to make loans to cooperatives to provide electricity in rural areas. Interest rates are distinctly favorable for constructing power lines and generating plants. They are amortized over a period of 35 years at 2 per cent interest. Funds for loans are obtained from the Reconstruction Finance Corporation with Congressional approval.

SAFE FARM MORTGAGES

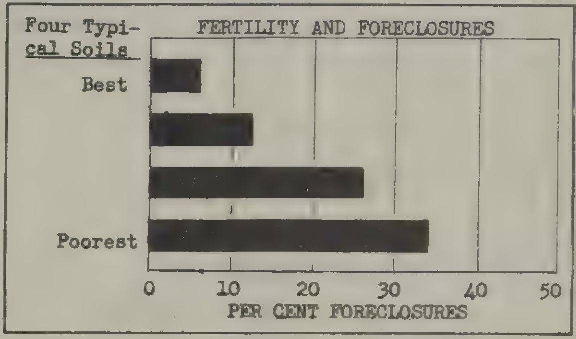
Loans properly analyzed at the time of making offer a security that cannot otherwise be obtained. Two distinct approaches should be used, i.e.,

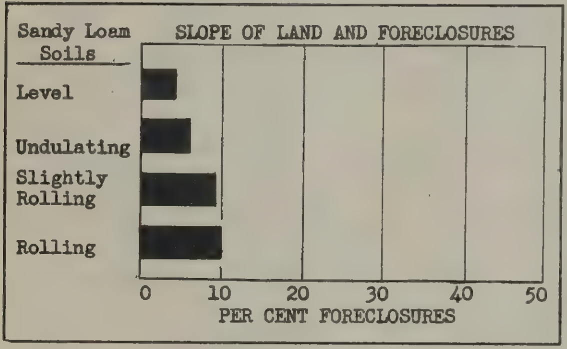
1. A study and appraisal of the physical security - the farm.
2. A complete and separate investigation of credit risk factors - the borrower, his business and financial record.

THE KIND OF FARM THAT WILL SUPPORT A MORTGAGE

EARNING ABILITY - - - Capacity to produce net income under typical operation is essential.

Soils frequently control earnings. More debts are paid on farms with good soils even though the debt per acre is much higher. Some studies show as much as 5 to 10 times better records in favor of good soils.





Erosion - Slope of land largely determines the severity of water erosion. Loans on farms of rolling to rough topography in some areas have been shown to fail much more frequently than loans on level land. Wind erosion also reduces the debt-carrying ability of a farm.

Crops that are adapted to the farm preferably should be diversified and the crop rotation should not depreciate the fertility of the land.

Taxes are a fixed charge that must come out of earnings hence must not be excessive, usually not over one and one-fourth per cent of the land value.

Size - The farm size must fit the ability and needs of typical ownership and be proper for the adapted type of farming. Farms of 160 to about 240 acres have been shown to be of efficient size for much of the Corn Belt. In some ranch areas, 10 to 20 sections, or 6000 to 12,000 acres, are efficient units.

ECONOMIC USE AND LOCATION FACTORS SHOULD BE FAVORABLE

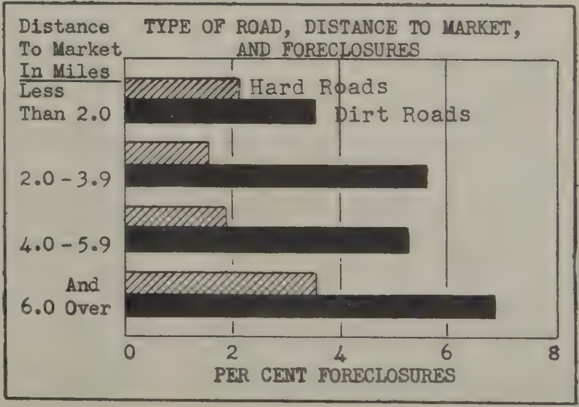
The following are closely associated with location and help to determine the amount of farm debts that are repaid:

Markets - Loan risks normally increase with distances from market.

Roads - Studies show that short distances on dirt roads are equivalent to much longer distances on hard roads in point of debt security.

Transportation - That necessary for the needs, location, and type of farming. Rapid, low-cost transportation is enabling distant dairy and vegetable farmers to successfully compete with those near the markets.

Community - Character of people, race, religion, and nationality have a bearing on debt-paying habits and ability.



SAFE FARM MORTGAGES

Hazards - Such as tornadoes, hail, and drouths; weeds, disease, insect, and other pests greatly increase loan defaults.

Natural Resources - Such as oil, gas, mineral, and timber, help pay many farm loans that would otherwise default.

FARM HOME FEATURES SHOULD BE DESIRABLE

House and Yard - Should be such as will appeal to capable operators.

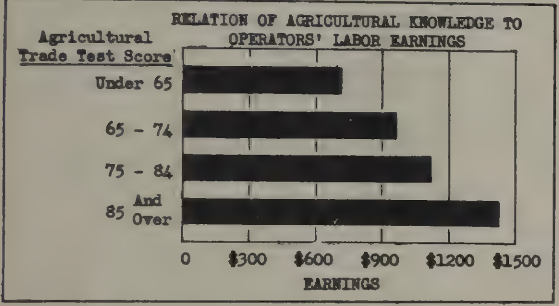
School and Church Facilities - Of desirable type should be accessible.

Neighborhood - Should be attractive and free of serious nuisances.

Only an accurate, detailed appraisal of the farm offered as security will reveal the facts necessary for a proper analysis of the foregoing security features. The appraisal should be confined to the physical property. Personnel factors should not be appraised with the land. Personnel factors as such are not bought, sold, and transferred with real estate.

THE KIND OF BORROWER THAT CAN AND WILL PAY A MORTGAGE

Much of the credit risk involved in making farm loans hinges about the borrower, his family, and business and financial record.


RELATION OF AGRICULTURAL KNOWLEDGE TO OPERATORS' LABOR EARNINGS

Age and Health - A farmer's earning capacity rises rapidly to age 30, reaches a peak at about 40, and falls quickly after 55. The falling income is associated with declining health and strength.

Knowledge and Skill in Farming - Tests show that this factor alone often determines whether a loan will succeed or fail.

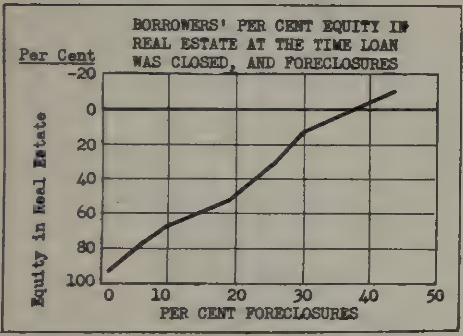
Sex - Is a factor in farm loan security because of the nature of the business.

Race, Color, and Nationality - Negroes, southern Europeans, and foreign-born present special problems.

Character, Marriage Record, Credit Record - Indicate some of the other personnel qualifications that are associated with safe farm mortgages.

Family Influences - Wives and children who cooperate increase the farm income and help keep down expenses. In this and other ways they provide greater stability of farm loans.

LOAN PLANS THAT SUCCEED


BORROWERS' PER CENT EQUITY IN REAL ESTATE AT THE TIME LOAN WAS CLOSED, AND FORECLOSURES

The loan plan must be adapted to the territory, the farm, and the borrower.

Purpose of the Loan - Must be constructive and preferably should be for purchasing or improving the mortgaged property.

Size of Loan and Percentage of Value - Must be such that repayments can be made. These important factors should be regulated by the characteristics of the territory in which a loan is located, and by what the statistical analysis shows to be the reasonable debt-carrying capacity.

Amortization or Repayment Plan - The income of the farm and the borrower should permit repayments, the rate depending upon such features as the type of farming, territory, risks, and hazards.

The usual rate of turnover for an agricultural investment is once in five to eight years. The average annual wealth accumulation by farmers during the 1920-30 period has been estimated at $338.00. At this rate a $3000 mortgage could be liquidated in less than ten years only by using nothing for improvements and the expansion of business.

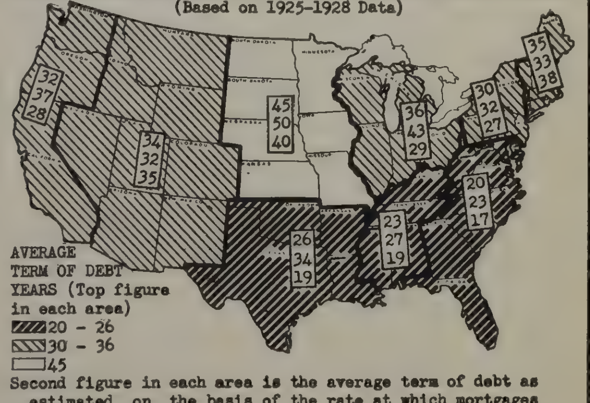
Length of Loan - The average life of a mortgage is estimated to be about 30 years. If made for shorter terms to accomplish specific purposes, mortgages should be made with at least a 30-year view ahead.

Dates for Paying Interest, and Interest Rates - Interest dates should coincide with the time when the borrower receives his income. Interest rates should reflect the hazards of the territory and of the particular type of farm industry.

Management Control - Should be sufficiently retained in the mortgagee to enable him to at least meet emergencies when they arise.

SUCCESS WITH FARM LOANS AS WELL AS IN THE EXTENSION OF OTHER TYPES OF CREDIT IS DEPENDENT UPON CAREFULLY CREATED LOAN POLICIES FROM WHICH THERE ARE NO DEVIATIONS WITHOUT WELL CONSIDERED ADJUSTMENTS OF THE LOAN PLAN.

COMPUTED AVERAGE NUMBER OF YEARS FARMS REMAIN UNDER MORTGAGE
(Based on 1925-1928 Data)



Second figure in each area is the average term of debt as estimated on the basis of the rate at which mortgages were paid off.

Third figure is the average term of debt based on the rate at which new mortgages were made

U.S. Averages - Figures in order shown on map
30 Years - Average term of debt
35 Years - On basis of rate mortgages were paid off
25 Years - On basis of rate at which new mortgages were made

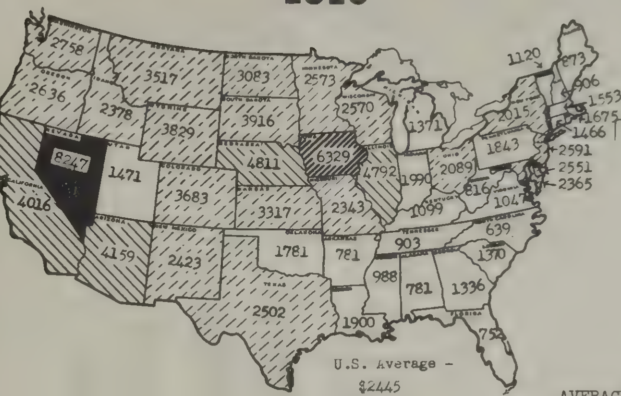
Based on Experiment Station Studies of Minnesota, Cornell, Illinois, Iowa, and Alabama, Farm Credit Administration, and U.S.D.A.

AVERAGE DEBT PER MORTGAGED FARM

Although both the number of mortgaged farms and the total farm-mortgage debt have declined, the average debt per farm mortgaged for the nation as a whole has increased somewhat since 1940. However, the average mortgage per farm has not as yet swelled to the size it did in 1920, after World War 1. Then the average debt per farm mortgaged was $5782. In 1945, the average debt was $2,882. There has been a slight increase since then, but there is little chance that it will reach the proportions of the previous postwar era. Farmers, for the most part, are in better shape financially today than they were following World War 1, and most farm owners now seem to be holding their debts down to manageable size.

The larger and more valuable farms are more frequently mortgaged than are the smaller and less valuable farms. As a result, the largest average debts are in areas of good soils or specialized crops.

1910

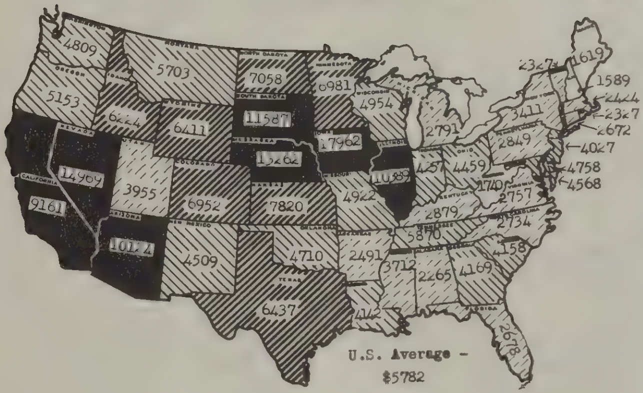


U.S. Average - $2445

AVERAGE DEBT PER MORTGAGED FARM

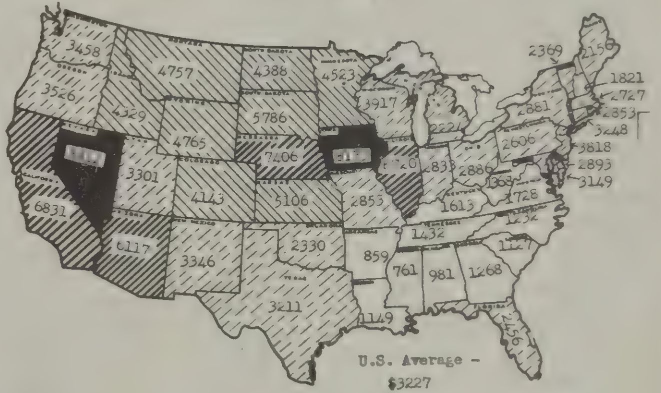
■	8000 - Over
▨	6001 - 8000
▧	4001 - 6000
░	2001 - 4000
☐	0 - 2000

1920



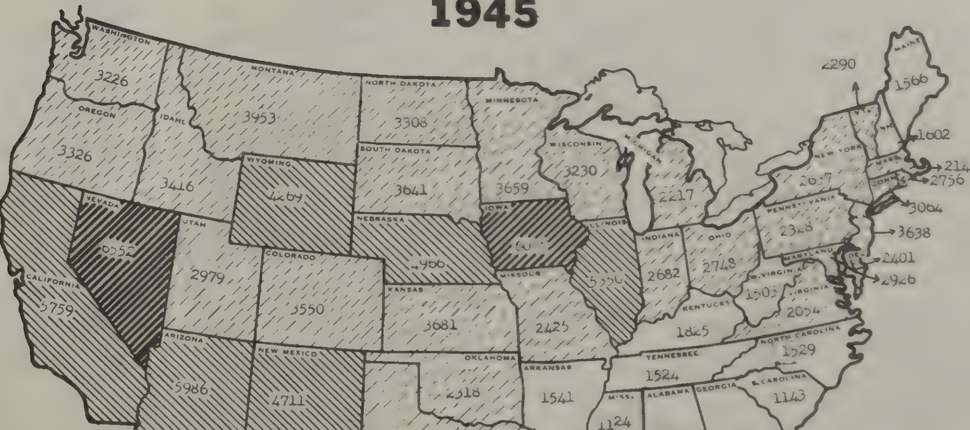
U.S. Average - $5782

1935



U.S. Average - $3227

1945



U.S. Average - $2882

Based on Data of U.S.D.A.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

WHO MAKES THE LOANS

Changes are also taking place in the proportion of the total mortgage debt owed to various lender groups. The rise in farm mortgage debt during 1946 was reflected in the holdings of each of the major lending groups, except the Federal Land Banks and Federal Farm Mortgage Corporation.

The loans held by the latter agencies continued the downward trend that has been evident since 1937. The loans of the Federal Farm Mortgage Corporation have declined approximately 80% since 1940. This decline is due largely to changes in the regulations, which permit the Federal Land Banks to take over "eligible" loans from the corporation, and to make loans for a higher proportion of the appraised value of farm real estate.

Although life insurance companies and commercial banks reported small reductions in total dollar value of mortgage loans since 1940, they now hold a greater percentage of the total debt outstanding.

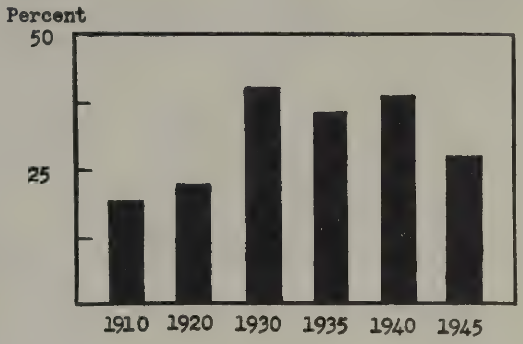
The pie diagrams below illustrate the shifting importance of the various lending agencies in the farm mortgages field from 1923 to 1945. The amount held by Federal Agencies reflects the increased emphasis being placed on lending activities of these agencies.

If past experience is any criterion, accelerated increase in the mortgage debt per farm and in the total mortgage debt can be expected as soon as prices of farm products begin to decline. After World War 1, one of the big reasons for the rapid increase in the farm mortgage debt was the inability of many farmers to make good on promissory notes and other short term debts when prices fell. As a result, these obligations were added to the mortgage debt on their farms.

FEWER FARMS ARE MORTGAGED

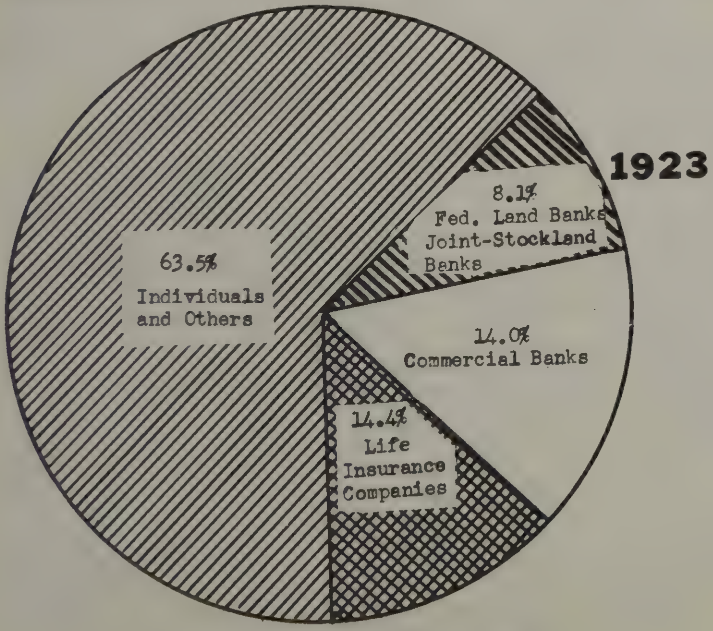
The number of farms mortgaged has decreased over ½ million in the last five years, a decline of 27.6%, but the total number of farms has also decreased. The accompanying chart shows the percentage relationship between the number of mortgaged farms and the total number of farms in the United States.

Per Cent of Farms Mortgaged, U. S.,1910-1945

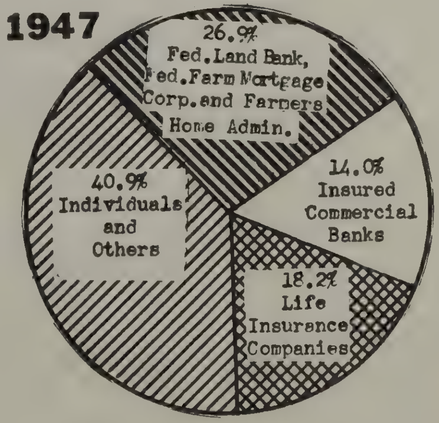


According to latest figures (1945), the South has the lowest proportion of farms under mortgage in the country, and that region also has had the greatest decline in the total number of mortgaged farms. The smallest reductions were in the Northern States, with New England and the Middle Atlantic down less than 20%. The New England, Mountain and Pacific regions also showed substantially lower proportions of mortgaged farms, although for some of these areas there was an increase in total farms. The highest proportion mortgaged in 1945 was 38.2% reported for the West North Central Region.

PERCENTAGE DISTRIBUTION OF TOTAL OUTSTANDING FARM MORTGAGE DEBT



1923 - Total Farm Mortgage Debt -
$10,785,621,000



1947 - Total Farm Mortgage Debt -
$4,777,355,000

Based on Data of U.S.D.A.

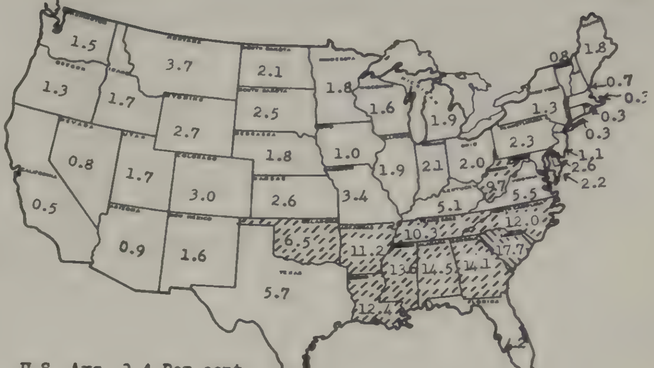
FARM MORTGAGES—WHO HOLDS THEM

The maps below show by states the distribution of loans held by various lending agents as a percentage of the total farm mortgage debt, January 1, 1945. The total farm mortgage debt was than $5,270,655,000. This data reveal the relative regional importance of the various lending agents to agriculture. Federal agencies hold 33 per cent or 1/3 of all farm mortgages; life insurance companies hold nearly 18 per cent; banks about 8.5 per cent; individuals roughly 30 per cent; and all others about 10.5 per cent.

The proportion of the total farm-mortgage debt held by the various lender groups on January 1, 1945 was as follows:

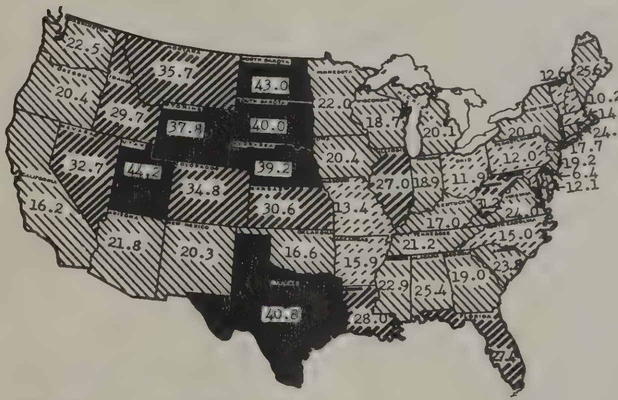
Lender	1,000 Dollars	Per cent
Federal Land Banks	$1,209,646	23.0
Federal Farm Mortgage Corp.	347,310	6.6
Farm Security Administration	178,936	3.4
Life Insurance Companies	933,723	17.7
Insured Commercial Banks	449,582	8.5
Others	2,151,458	40.8
Total Outstanding	$5,270,655	100.0

FARM SECURITY ADMINISTRATION



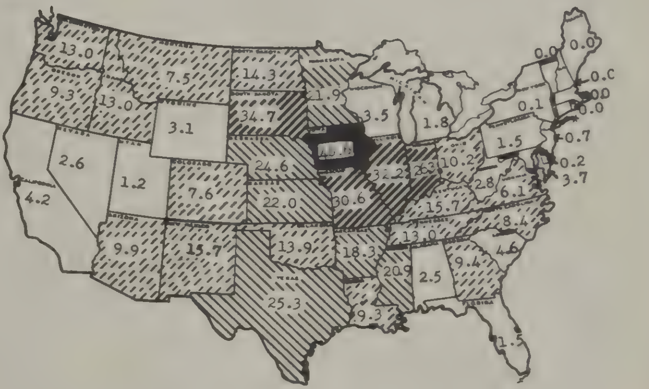
U.S. Avg. 3.4 Per cent

FEDERAL LAND BANK



U.S. Avg. 23.0 Per cent

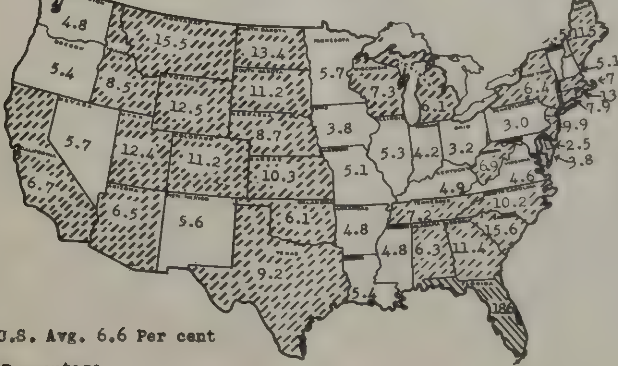
LIFE INSURANCE COMPANY



U.S. Avg. 17.7 Per cent

FEDERAL FARM MORTGAGE CORPORATION

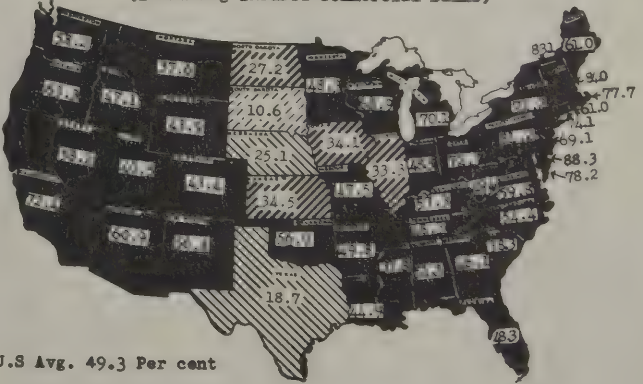
LAND BANK COMMISSIONER



U.S. Avg. 6.6 Per cent

OTHERS

(Including Insured Commercial Banks)



U.S Avg. 49.3 Per cent

Percentage

- ■ 36 & over
- ■ 26 - 35.9
- ▨ 16 - 25.9
- ▨ 6 - 15.9
- ☐ 0 - 5.9

U.S.D.A.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

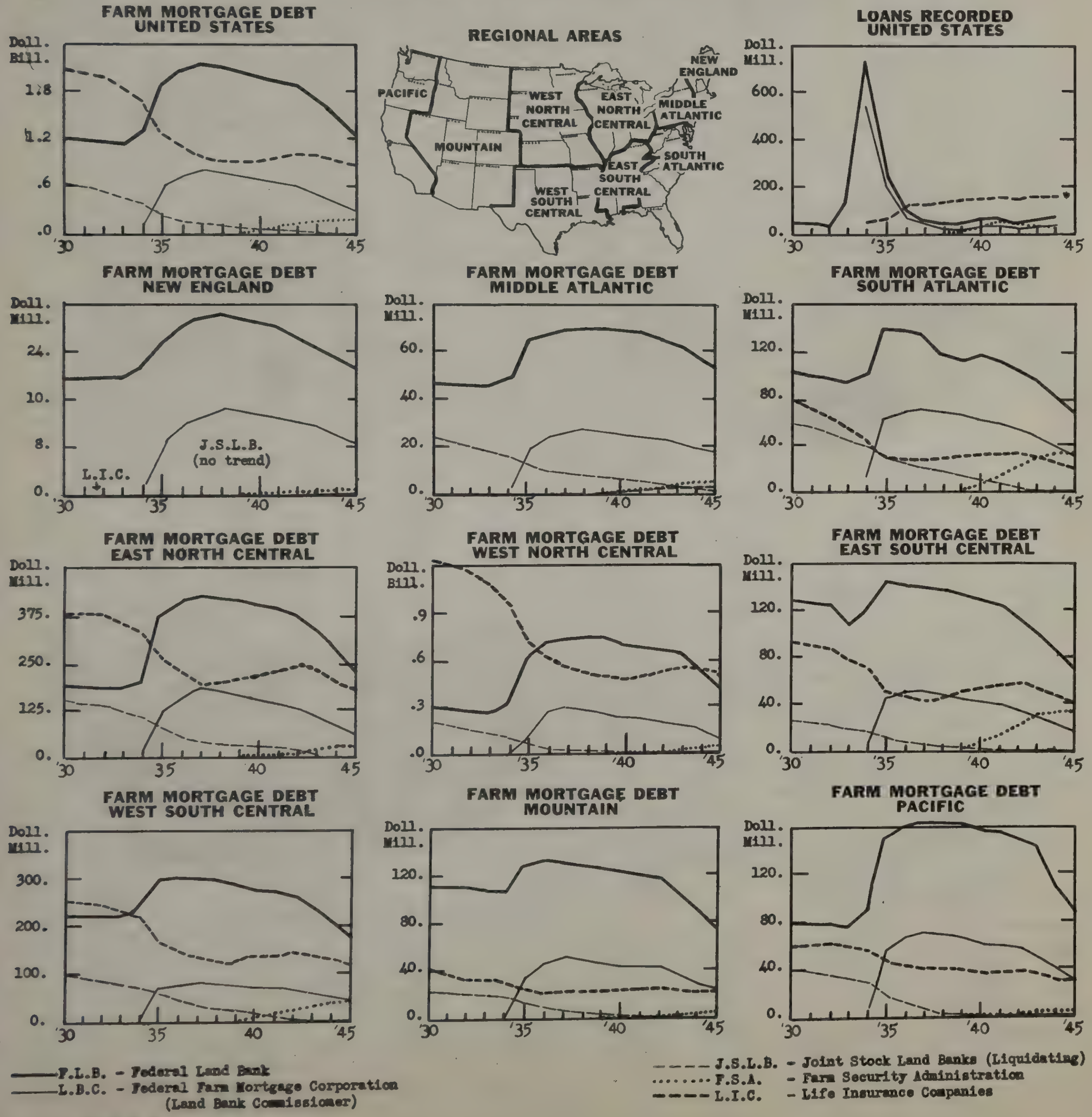
FARM MORTGAGES—WHO HOLDS THEM

REGIONAL CHANGES IN FARM MORTGAGE INDEBTEDNESS AND THE TOTAL HOLDINGS OF VARIOUS LENDING AGENCIES

Changes in the volume of loans held by major lender groups have varied substantially from the over-all change in the total farm-mortgage debt (graph 1). The trend in loans held by all lenders was down between January 1, 1930 and January 1, 1933. Beginning in 1933, however, the loan operations of the Federal land banks and the Federal Farm Mortgage Corporation increased substantially while the loans of life insurance companies, commercial banks, joint-stock land banks, and others were reduced. After reaching a peak in loan operations and loan holdings in 1937, the loans of the two federally sponsored agencies have fallen more rapidly than have the loans of the other lenders. The Farm Security Administration is the only lender to show any appreciable upward trend in the amount of loans held. Life insurance company loans showed some strengthening between 1939 and 1942 but decreased again in the years 1942-44. Loans of commercial banks show a trend similar to that of life insurance companies except for the last year when loans held by banks increased slightly, whereas those of life insurance companies continued to decline.

The trend by regions corresponds very closely with that of the entire United States. See graph below.

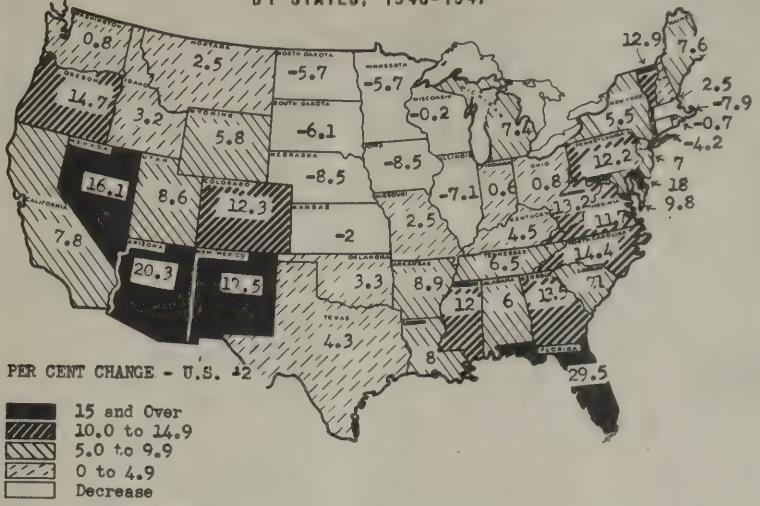
FARM MORTGAGE DEBT AND NEW LOANS RECORDED TOTAL BY LENDING AGENTS



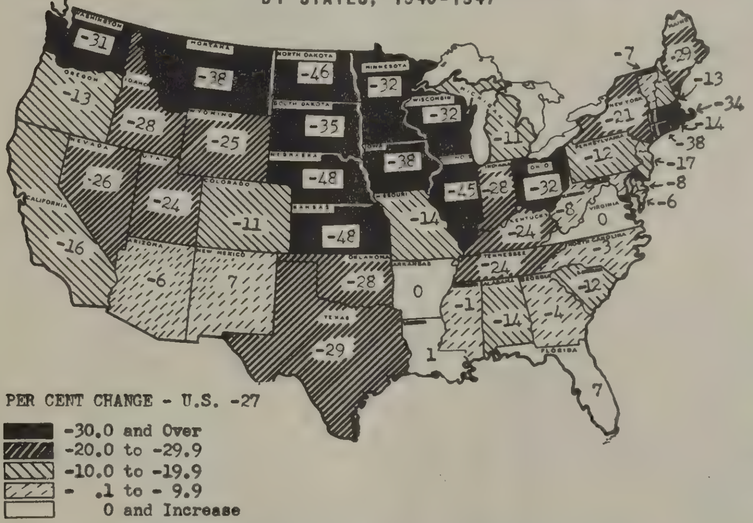
B.A.E. & U.S.D.A.

FARM MORTGAGE DEBT

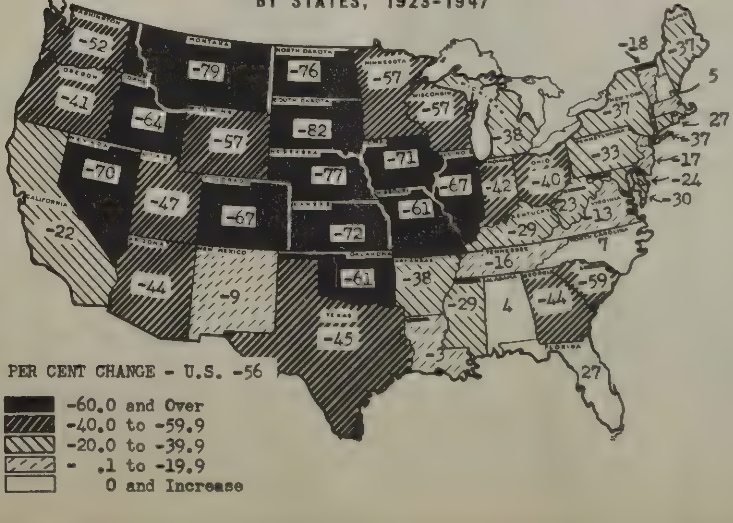
PERCENTAGE CHANGE IN FARM MORTGAGE DEBT,
BY STATES, 1946-1947



PERCENTAGE CHANGE IN FARM MORTGAGE DEBT,
BY STATES, 1940-1947



PERCENTAGE CHANGE IN FARM MORTGAGE DEBT,
BY STATES, 1923-1947



Farm mortgage debts are on the increase after more than 20 years of steady decline. On January 1, 1947, farm mortgage debt totaled $4,777,355,000, an increase of $95.635,000 over January 1, 1946. This was the first year since the 1923 peak that farm mortgage debt increased for the United States as a whole.

The West North Central and a few New England states were the only areas that continued to show a decline in net farm mortgage debt through 1946. Elsewhere debts increased, particularly in the West and in states along the Atlantic coast.

The increase in mortgage debt during 1946, although small, (2 per cent for the United States as a whole) contrasts sharply with the large debt reduction in the years 1940 through 1946. In that period only three states, New Mexico, Louisiana and Florida, showed an increase in farm mortgage debt. Preliminary reports indicate that during 1947 mortgage debt increases continued in approximately the same areas as in 1946.

This upward trend in farm mortgage debt is expected to continue for a long time; but, because of the prospects of favorable farm incomes for the next few years, the rise in total debt will probably be slow. Regions with fertile soils and those whose major source of income enters into the European Recovery Program should have a relatively favorable experience while the program is in effect.

FARMERS EQUITY

Farmers' equity in their farms now compares favorably with the pre-World War I years of 1912-14. The last "Balance Sheet of Agriculture" shows that farmers owed only $70 on each $1000 worth of real estate owned in 1947.

Heavy farm mortgage debts do not become a national problem until farm income drops. They do not become excessive until real estate values decline. In 1920, when farm values were at their World War I peak. the farm mortgage debt ($8,448,772,000) was not considered a serious problem; but in 1933 a similar farm mortgage debt ($8,638,383,000) proved to be very destructive. Because of changing land prices resulting from changing economic conditions, a mortgage debt of almost the same amount was only $127 per $1000 of value in 1920; and 13 years later assumed the crushing proportions of $281 per $1000 of value.

Sound appraising and conservative loan policies are needed. When land values are advancing and money is easy, loans based on the current sale price of land tend to be excessive. In hard times they tend to be too conservative.

The American Rural Appraisal System is an effective appraisal tool that can be used to avoid many of the pitfalls of changing conditions. This system of appraising reveals basic, or long time value. It shows the value derived from earnings and also that derived from other sources that may or may not help to pay off the mortgage. This system protects

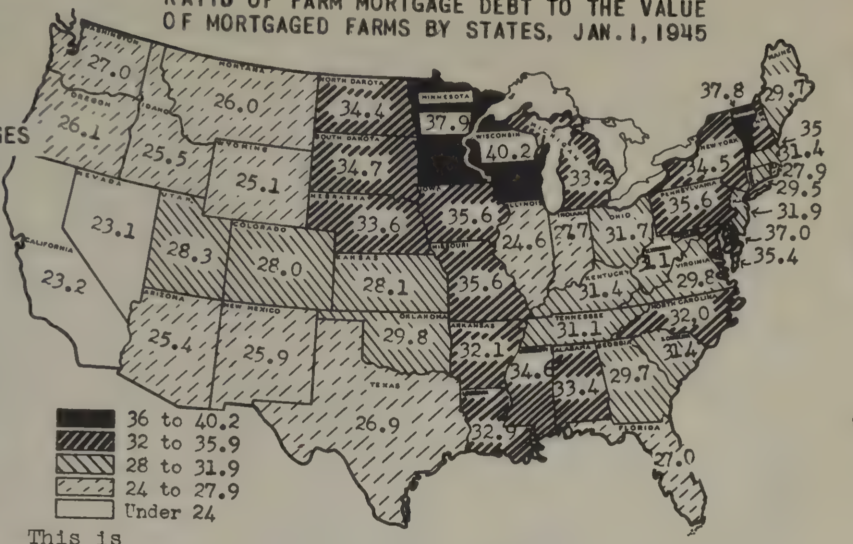
(Continued on back)

DOANE AGRICULTURAL DIGEST JULY, 1948
This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U. S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

FARM MORTGAGE DEBT

the borrower from being made the victim of vicious economic cycles. Lenders are also protected because they know that conservative lending policies based on Basic Value Appraisals are sound.

RATIO OF FARM MORTGAGE DEBT TO THE VALUE OF MORTGAGED FARMS BY STATES, JAN. 1, 1945

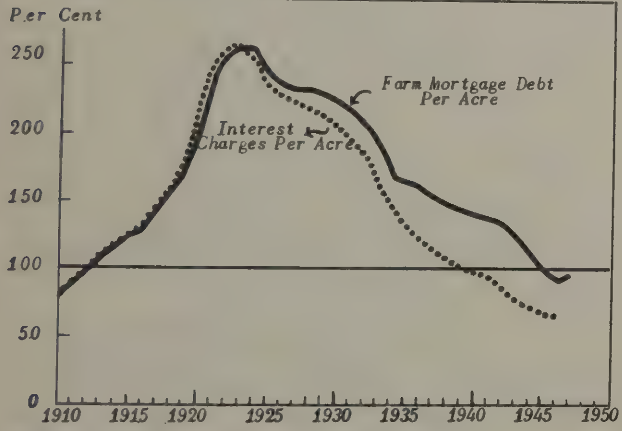


FARM MORTGAGE DEBT AND INTEREST CHARGES

The accompanying graph shows the trend of both farm mortgage debt per acre and interest charges per acre. As with total outstanding debt, farm mortgage debt per acre (based on all land in farms) increased substantially after 1910 and reached its peak in 1923. Until 1946 there had been an almost continuous decline to near the 1911 level. The increase in mortgage debt in 1946 indicates that the trend may now be reversed.

Interest charges per acre (payable on farm mortgage debt) have declined more rapidly than total debt. This is the result of a decline in interest rates from 6.4 per cent in 1923 to 4.8 per cent in 1947. Total interest charges which farmers pay are influenced by the distribution of farm mortgage loans among the high cost and low cost lending groups. However, the gradual decline in interest rates has occurred despite a relative increase in the proportion of the total debt held by the higher interest rate lenders. Loans by individuals, although carrying a higher interest rate, make up slightly less than half of all new loans made at the present time.

FARM MORTGAGE DEBT AND INTEREST CHARGES
United States, 1910-47
Index Numbers of Amounts Per Acre (1910-14 100)



Source: U.S.D.A., B.A.E.

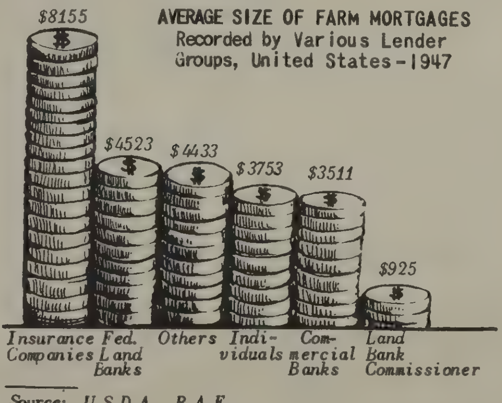
AVERAGE SIZE OF MORTGAGE DEBT

The average size of the farm mortgage debt varies with the different lending agencies. This is, in large part, due to the differences in the type of loans made. Loans for the purchase of real estate usually average larger than loans for making farm improvements or purchasing farm equipment and other capital goods.

In the last ten years there has been a substantial increase in the average size of loans recorded by private individuals and institutions compared with loans made by agencies sponsored by the federal government. The increased dollar volume of mortgage recordings in recent years reflects an increase in the average size as well as in the total number recorded.

The accompanying graph shows the relative size of farm mortgage loans reported by the various lender groups. Loans by the Land Bank Commission are normally used to make available more funds than would otherwise be authorized under the laws governing the activities of the Land Banks.

AVERAGE SIZE OF FARM MORTGAGES
Recorded by Various Lender Groups, United States - 1947



Source: U.S.D.A., B.A.E.

DANGER SPOTS

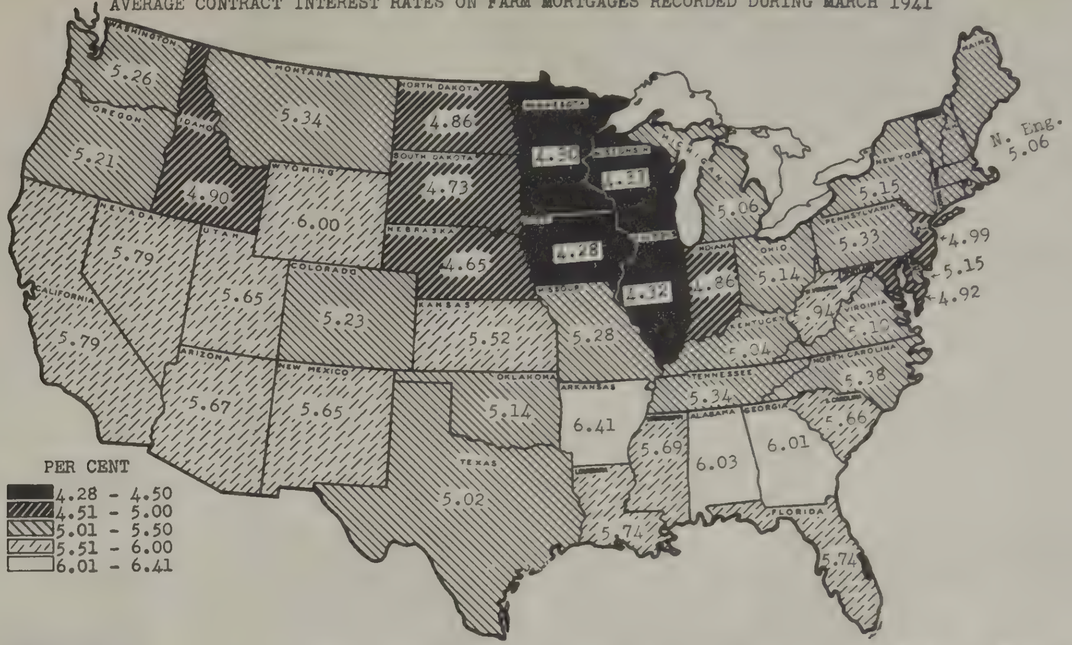
The figures used in this report are averages and fail to reveal the fact that many farms are now mortgaged to the hilt. Nearly half of the farms bought last year required a mortgage of some kind. Of this group, three out of four (74 per cent to be exact) required a loan equal to or above the estimated full sale price of the farm in 1940.

New farmers are in the weakest financial position and will suffer most if prices drop. When the "honeymoon" is over we will all be surprised at the number of people who got caught.

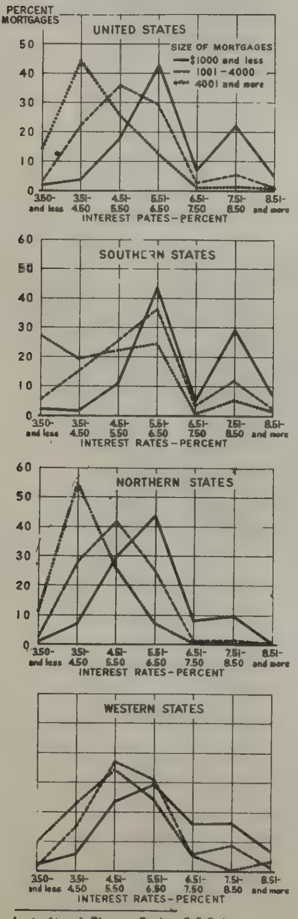
Based on U.S.D.A. data

FARM MORTGAGE INTEREST RATES

AVERAGE CONTRACT INTEREST RATES ON FARM MORTGAGES RECORDED DURING MARCH 1941



PERCENTAGE DISTRIBUTION OF CONTRACT INTEREST RATES ON FARM MORTGAGES RECORDED DURING MARCH 1941, By GEOGRAPHIC REGIONS AND SIZE OF MORTGAGE



Agricultural Finance Review, U.S.D.A.

Farm mortgage interest rates have been declining since 1921. The most rapid adjustment has occurred since 1931 and in the last decade interest rates have declined nearly 25 per cent in the West, South, Central, and Mountain states. The least change recorded is in the Atlantic and Pacific states where the decline was 15 per cent.

That there is a wide spread in the rate of interest charged by the different types of lending agencies is shown on page 562.4.

Bank rates are higher than those of the other lending agencies principally because of the wide variation in financial services rendered by these institutions. Interest rates charged by individuals vary widely but the whole is greatly influenced by low rates charged on intrafamily credit.

Insurance company loans are concentrated in the best farming areas where the loan per farm is large and service costs per dollar loaned can be held to a minimum. Their interest rates reflect largely the rates that can be secured from other types of investments.

Federal Land Bank loan rates are fixed by law at one per cent above the interest rate on the last issue of bonds, or approximately four per cent at the present time. Land Bank Commission loans bear a contract rate of 5 per cent. The effective rate of Land Bank Commission loans and Land Bank loans has been fixed by congress at 3.5 per cent until July 1, 1942.

Tenant purchase loans advanced through the Farm Security Administration are made at a rate of 3 per cent. (See page 407)

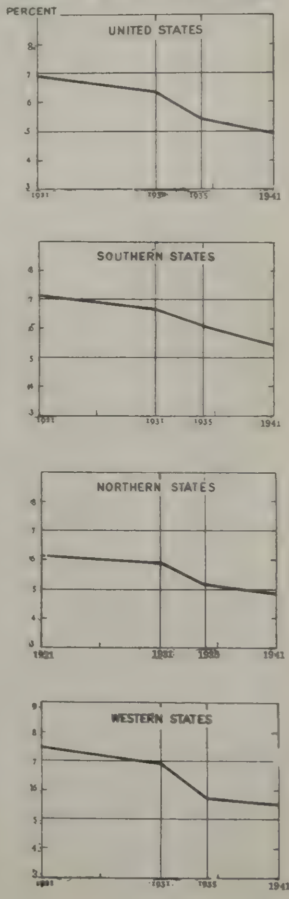
The three factors listed below contribute largely to the variation in the rate of interest charged by the different agencies:

1. State legislation limiting maximum interest rates.

2. The activity of large institutional lenders. Competition by such lenders in states like Iowa and Illinois causes the lowering of rates charged by other lenders. By contrast, Florida has mostly local lenders and, as a result, higher rates.

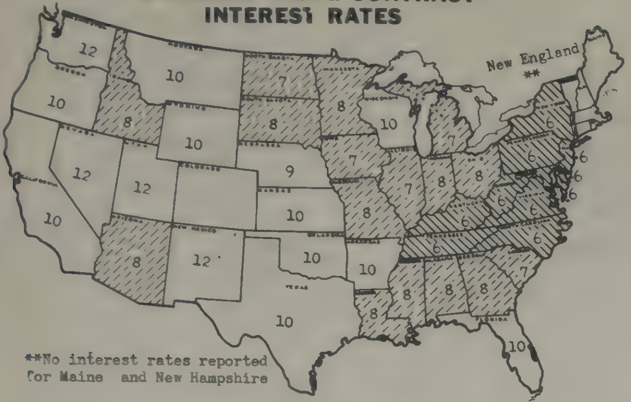
3. Competition among local funds.

AVERAGE CONTRACT INTEREST RATES ON FARM MORTGAGES RECORDED DURING MARCH 1941 AND COMPARISONS WITH EARLIER YEARS, BY GEOGRAPHIC REGIONS



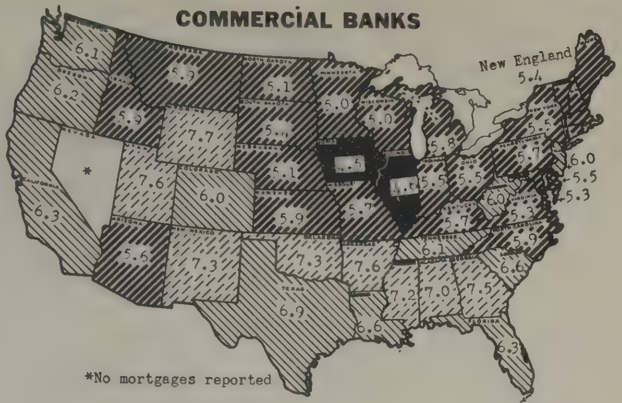
CONTRACT INTEREST RATES ON FARM MORTGAGES

MAXIMUM LEGAL CONTRACT INTEREST RATES



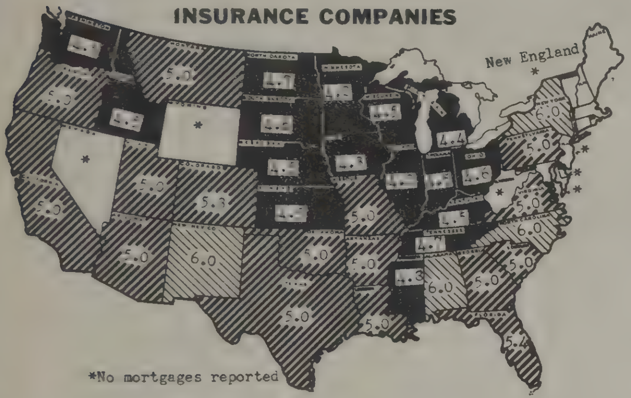
**No interest rates reported for Maine and New Hampshire

COMMERCIAL BANKS



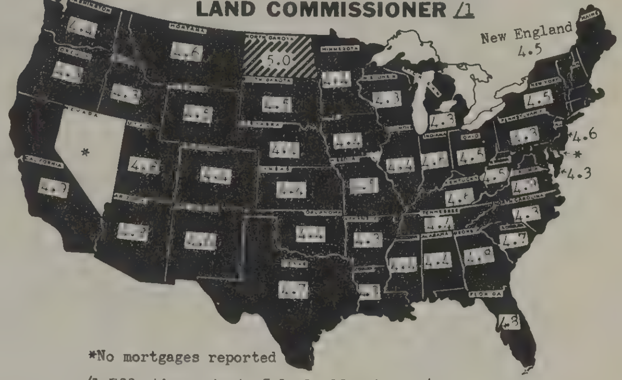
*No mortgages reported

INSURANCE COMPANIES



*No mortgages reported

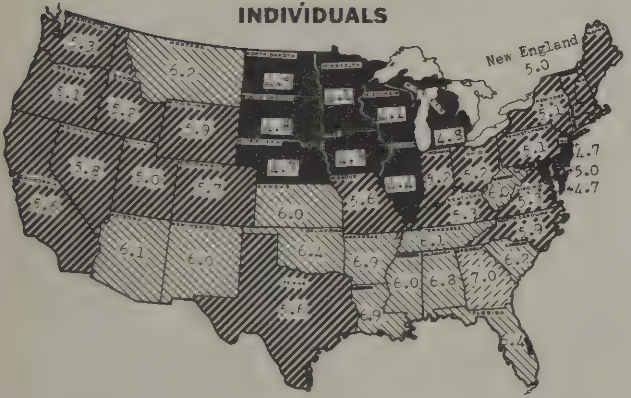
FEDERAL LAND BANKS AND LAND COMMISSIONER /1



*No mortgages reported

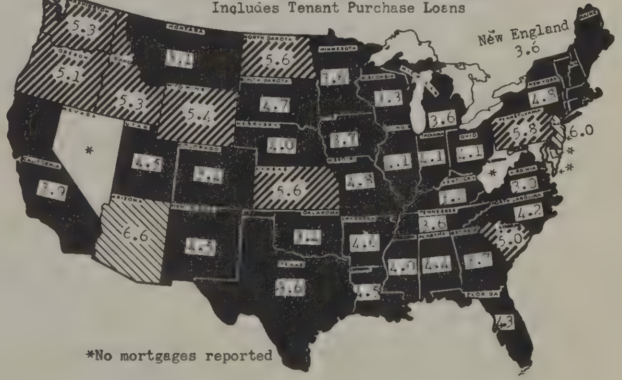
/1 Effective rate to July 1, 1942 is 3.5%

INDIVIDUALS



MISCELLANEOUS LENDERS

Includes Tenant Purchase Loans



*No mortgages reported

AVERAGE CONTRACT INTEREST RATES ON FARM MORTGAGES RECORDED DURING MARCH 1941

■ 3.0 - 4.9 ▨ 5.0 - 5.9 ▧ 6.0 - 6.9

▨ 7.0 - 8.9 ☐ 9.0 - Over

Maximum legal interest rates normally exceed the average interest rates charged by a considerable margin.

In the most highly developed agricultural region of the midwest where loan experience has been favorable, competition for all kinds of agricultural loans is high and major lending groups hold interest rates at a minimum.

In the southern states many small high risk loans are financed by banks, merchants, and individuals. A high rate of interest is charged. Other lending agencies especially those sponsored by the government charge much lower rates.

Interest rates charged by the Federal Land Bank and Land Bank Commissioner stand in sharp contrast to other lending agencies because of their almost uniform interest rate throughout the country regardless of the varying loan risk by regions. It is significant also that the miscellaneous lending group which includes the new Tenant Purchase loans also has a relatively low interest rate.

Agricultural Finance Review, U.S.D.A.

TO THOSE WHO LEND MONEY —

SOUND SOIL CONSERVATION LOANS

The Federal Reserve Bank of St. Louis, under the leadership of its President, Chester C. Davis, has just released a bulletin which should be studied by every community leader as well as every farmer---BANK CREDIT FOR SOIL CONSERVATION. Darryl R. Francis, Agricultural Economist, is the author.

The bulletin can be used as a guide by farmers who need to finance conservation development on their farms. Community leaders are shown the results of soil conservation and how sound planning can pay profits above costs. Credit agencies are shown how to tailor credit to the needs of individual farms.

It is an effective indictment of the old system of standard-type loans and loans "......with no requirement as to how the mortgaged farms shall be handled."

If these excerpts challenge your thinking in regard to your farms or the community that you serve, you will want to secure the booklet. It contains two case studies that have broad application.

D.A.S. AGRICULTURAL DIGEST

FOREWORD

In the past, too few people have been concerned about the tragic toll that was being exacted by erosion arising from improper farming practices. When land was cheap and plentiful it did not seem to matter much if, when the soil had washed away and its fertility exhausted, the farmers moved on to new land.

As a result of this attitude, in our short life as a nation we have ruined some 50 million acres of good land; it is abandoned; it cannot be farmed. Another 50 million acres are swiftly coming to that stage. There isn't much that can be done about it now. One hundred million acres gone—the equivalent of three states of Illinois.

On another 100 million acres more than half the topsoil is gone and on a third 100 million acres the erosion process is actively under way. Only prompt, vigorous, and intelligent action can stop further losses and start to restore the fertility on much of this land.

Proper soil management is not merely a farm problem. The future of many of our towns and cities in large part depends upon the maintenance of the fertility and productiveness of the farm lands which surround them.

Chester C. Davis,
President

The introduction of a complete soil conservation or balanced farming program on the individual farm involves setting up a plan of operation which includes a water management system, cropping and pasture practices adapted to the soil of the particular farm, and a livestock program that lends itself to the system of crop and pasture production best suited to the farm. This means an operating program that not only maintains but improves the soil and its fertility, and increases crop and livestock production. To introduce such a program involves a capital investment the size of which varies with conditions found on the individual farm. The solid results in terms of increased income which are shown by the records available from the many farms that have adopted complete conservation programs in the past prove that such investments pay for themselves and thus provide a basis for the sound extension of credit to finance them.

Farm Plans Essential to Successful Lending

For a bank contemplating the extension of soil conservation loans the first step is to be sure that the farm plans submitted are properly drawn. Drawing up a complete water management and balanced farming plan for an individual farm is a highly technical job. Farmers generally do not have the technical knowledge to do it for themselves and must rely upon obtaining trained assistance from the outside.

Such technical advice should be available to both farmers and bankers on an increased scale as more trained men are available after the war. Some country banks have employed farm representatives who are qualified to prepare such plans. Most banks, however, do not have trained men on their staffs at the present time. In many counties the agricultural extension agent is well qualified to prepare farm plans. An increasing number of agricultural areas have organized soil conservation districts. In these districts the services of technicians of the soil conservation service, as well as of the county extension agents, are available to the farmer in drawing up complete conservation plans. In some places professional conservation contractors are qualified to help the individual farmer in working out proper water management plans.

In considering a soil conservation loan application, if a bank does not have a qualified agricultural representative it should require a complete farm plan that has been prepared or approved by the extension agent or soil conservation representative of the area. Also, the services of these men should be available to the bank in providing an orderly check to see that the original conservation program is being adhered to over the period that the loan is outstanding.

An adequate soil conservation and balanced farming plan should detail the yields and total production that are to be expected as compared with the yields and production on the farm as it was operated prior to the introduction of the new practices. Such a comparison provides the best means of demonstrating the benefits of conservation farming, enabling both farmer and lender to appraise the merit of the credit required to finance the necessary investment. Generally speaking, such a comparison tends to minimize the advantages of the conservation program. This is because it assumes that yields under old practices would be continued at a constant level. In actual practice, however, the tendency as farms are generally handled is for productivity to decline unless positive measures are taken to maintain lasting soil fertility.

In working out a conservation plan of operation, anticipated increased yields should be based on results obtained under similar practices on experimental plots and under actual farm operation on land of similar type located in similar geographic areas. The college of agriculture of every state has sufficient background data of this type to make it possible to work out a program in which anticipated increases can be based on actual results, which pretty well takes the guess out of planning and makes it possible for a farmer to proceed with reasonable assurance of results so long as he follows the recommended practices worked out in the plan. The costs of putting the conservation plan into operation should be computed on the basis of current contract prices for doing the work involved. Normally there should be relatively little fluctuation in costs over the two to five-year period required to put the system into complete operation. Since costs for this type of work are now at or near a peak there will probably be a tendency for them to decline somewhat over the next few years.

In computing anticipated increased income that should accrue as the result of the better practices, an average of farm prices over a period of fifteen or more years should be used. Since the original plan may cover a period of several years the use of average prices would give a more conservative estimate of results than current prices.

Credit Terms Should Be Flexible

Any program for advancing credit to farmers for specific purposes should be worked out on a basis that permits plenty of latitude for individual circumstances. This is particularly true of soil conservation credit since the demand will range from the farmer who is out of debt but who lacks the available cash to complete a conservation program, all the way up to a young farmer who is just purchasing a farm with a minimum down payment, but who wishes the additional credit necessary to enable him to carry out a complete conservation plan of operation.

In actual practice the demand for loans requiring the maximum amount of credit will probably be small, but banks should be in a position to extend credit on the maximum basis where a sound program is submitted. To provide the maximum farm purchase mortgage credit, and in addition advance funds for complete soil conservation, will in many instances involve a reappraisal of the real estate security. In considering the farm purchase mortgage credit the bank will appraise the land on a normal value basis.

Improvements Constitute Sound Basis for Reappraisal

In those instances where conservation planning involves considerable capital expenditure for such purposes as liming, fencing, terracing, etc., the reappraisal can be made by adding to the appraised normal value the total cost of the capital items going on the land as the result of the conservation program. This is a perfectly sound procedure that is commonly followed in nonfarm real estate mortgage credit, but to a lesser extent in connection with farm mortgage credit. The reappraisal on this basis is certainly good business practice and it enables a bank to maintain a sound margin of security while advancing credit for the conservation program.

Disbursements and Repayments Geared to the Farm Plan

The disbursement schedule on a conservation loan should be determined by the amounts needed to complete the work as outlined in the balanced farming plan. Disbursements should be made over a period of years as the individual jobs are completed. The repayment plan is predicated upon the anticipated increased income resulting directly from the better farming practices adopted in the balanced farming plan. To allow for some variation in the weather, prices, etc., the fixed annual payments on the conservation loan might be established at seventy-five per cent of the total anticipated increased income by years. This should enable the farmer to repay money borrowed for conservation purposes with income originating directly from the conservation expenditures. The income that would be produced by the farm under an ordinary plan of operation should therefore not be reduced by the repayments on the conservation portion of the loan. It would be left free for the operator's use in meeting family living costs, operating expenses, and the principal and interest payments on the portion of the loan that is equivalent to a customary first mortgage loan. The real estate will stand as security for the loan, leaving the farmer's operating assets free to provide for usual expenses and as security for any operating credit that may be needed. As the conservation plan of operation develops, some credit would likely be required for the purpose of increasing foundation livestock holdings to keep livestock production in step with increased crop and pasture production.

Soil Conservation Practices Enhance Security

Since soil conservation practices add to the productivity of the land, the land itself should be the security for the loan. If the farm already has a mortgage against it, this, together with the funds advanced for the conservation program, should be consolidated into a new first mortgage loan. The program should be developed as a two-loan proposition with the customary first mortgage loan portion considered separately from the conservation, or balanced farming, portion. In this way the conservation credit may be adapted to the individual farm plan. The conservation portion of the loan will vary in terms according to the cost of the program and the increased production that will develop. After the conservation portion of the loan is developed it can be added to the credit advanced for farm purchase or refinancing, bringing the two together as one line of credit. Total repayments on the loan are determined by adding the regular amortized principal payments of the customary first mortgage portion to the annual principal payments on the conservation portion of the loan. The total of the two represents the total annual principal payments on the loan which may be made annually or semi-annually, according to the desires of the lender and the borrower.

Conservation loans as visualized in this booklet are somewhat new in farm mortgage financing. With the exception of the Farm Security Administration's tenant purchase loan, most farm mortgages do not include a clear-cut plan for proper maintenance of the soil resources on mortgaged farms. Farm mortgage credit has largely been based on a percentage of the appraised value of the farm with no requirement as to how the mortgaged farm shall be handled. Under the usual farm mortgage the borrower is at liberty to follow operating programs that may be disastrously destructive to the soil resources of the mortgaged farm, and hence decidedly adverse to the best interests of the lender. As long as the borrower makes the required annual payments on his loan there is little the lender can do to prevent undermining the fundamental basis of his security. The experience of many lenders who were obliged to assume ownership of farms on which exploitation of soil resources resulted in a decline in the security value more rapidly than the annual principal payments had reduced the mortgage indebtedness, testifies to the soundness of incorporating proper soil management programs into farm mortgage credit.

There are some areas in many communities where soil depletion is so far advanced that it may not offer an economically sound rehabilitation prospect for the individual farmer. In making conservation loans, bankers must be alert to such situations and not attempt to finance programs that in the outset offer an economic impossibility for the prospective borrower. The bank's best protection against becoming involved in such a program has been previously outlined in the discussion regarding the requirements for a plan drawn and approved either by the county extension agent or the soil conservation service. This approval will provide a bank with necessary protection against assuming an unworkable obligation.

If properly planned and serviced, soil conservation loans offer a type of farm mortgage financing in which the real value of the security will be enhanced while the principal indebtedness is being reduced. Credit extended on this basis should be a constructive development from the standpoint of the borrower, the lender, and the community.

CASE STUDY

Achievements

CORN BELT - N.W. Missouri

Thus, a $10,000 investment in soil conservation is repaid in ten years. From a longtime viewpoint this investment will have raised the net annual income of the farm by $2,000. Thus the investment has paid for itself without dipping into the normal income from the farm operation. The farmer, while making and repaying this rather sizable investment, will continue to have throughout the period as much income for operating and living expenses as he would have had if the conservation program had not been adopted. This is an excellent illustration of the way in which an investment in soil conservation can materially raise net income and the living standards on the individual farm and at the same time preserve the future productivity of the land.

OZARKS

The operator has used varying amounts of bank credit in the process of creating a highly profitable farm unit out of poor, abandoned, and stony Ozark hill land. From a modest start in 1926 with five and six dollar land and a poultry program, the operation on this farm progressed to the point where in 1944 the gross sales of farm products on the farm exceeded $8,000, with no reduction in inventory holdings of foundation stock. The farm today is a well improved unit with sufficient fences, barns, and outbuildings to accommodate a livestock program.

All indebtedness has been retired. The operator has a substantial holding of liquid reserves, and a new home is in the process of construction.

Thus, as a result of a carefully worked out soil conservation and balanced farming program, success and security have been realized from a beginning which to the average observer promised little more than certain failure for anyone daring enough to hope to make a living on the land.

BANK WITH CONFIDENCE

Banks have become solid financial insitutions which merit the confidence of those who have money, stocks, bonds and other valuables requiring safe keeping.

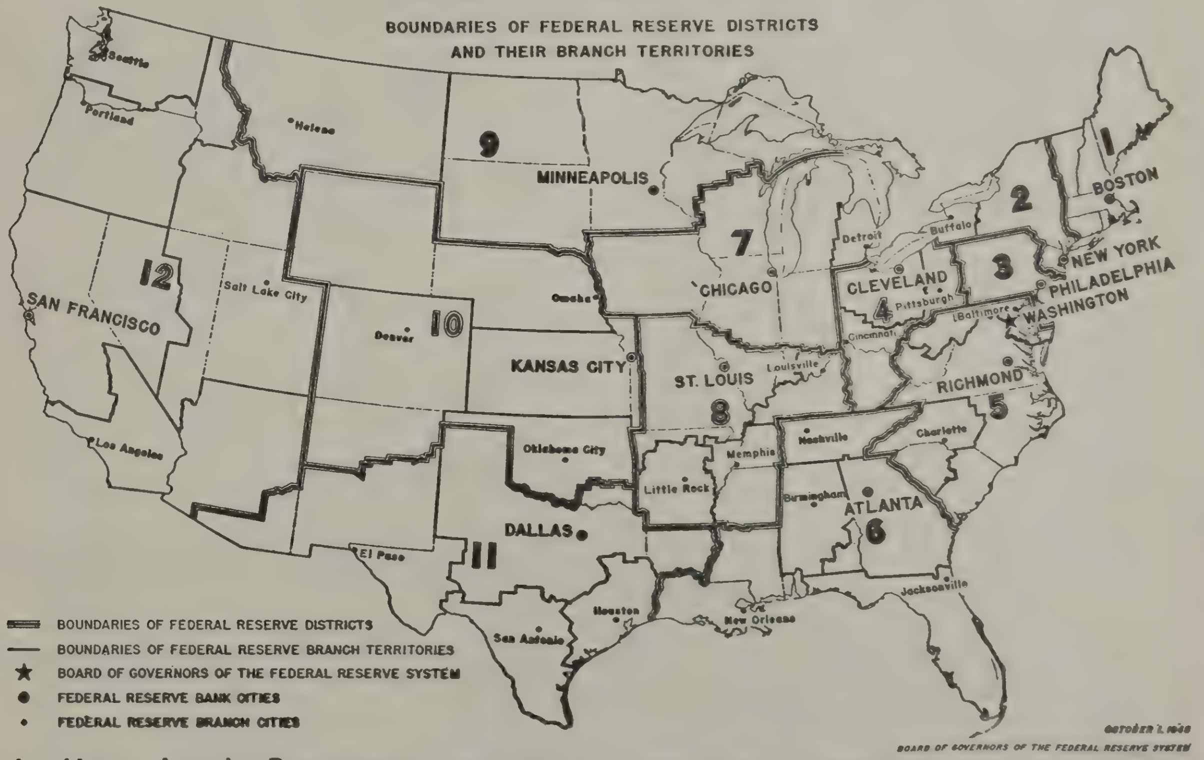
This needs to be said because there is still a hang-over of fear of bank failures such as occurred during the pioneering days of this young nation -- and because of the wholesale failures which closed one-half of the banks during the severe depression of the 1930's.

Those who persist in doing business without a bank account -- and who hide money in the mattress or bury it in cans, need to recognize that ☞ the banking system has made rapid progress since 1933 and now stands as the well established financial center of the more mature economy of the United States.

The Federal Reserve System of 12 regional banks and 24 branches can quickly get funds to any bank that has acceptable collateral. Money flows freely to the point of need so long as the local bank has acceptable security with required margins. "Its operations result in making the entire currency supply elastic."

No longer is there the reasonable probability that the demand for cash will not be met to cover the sound assets of a bank -- such as occurred when runs developed on isolated banks, even as late as the depression of the 1930's.

FEDERAL RESERVE SYSTEM



Banks Have Ample Reserves to cover all deposits. Much of these resources are in Government Bonds immediately exchangeable for cash. This condition is apt to continue for an indefinite period as banks are carrying a large portion of the Federal debt -- in 1950 banks held $80 billion of the $260 billion owed by the government.

To the extent that banks own Governmental bonds and other Federal instruments, they have the United States and the Federal Reserve System ready to pay their depositors. In addition, there is the $10,000 of Federal insurance coverage for each bank account.

Deposits Are Insured: up to $10,000 per bank account -- the 1950 law authorized the increase from the previous limit of $5,000. The United States carries the insurance through the Federal Deposit Insurance Corporation. Most, but not all banks are insured.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
COPYRIGHT 1950 by DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

BANKING WITH CONFIDENCE

The $10,000 insurance is adequate to give full protection to most depositors -- it eliminates the need to split deposits, except for those with the larger businesses.

Amortized Loans are another factor in bank stability. Borrowers are usually on a repayment basis that tends to increase their equity and thus make loans more acceptable collateral for securing more credit or cash as needed.

PAY BY CHECK

Farming as a business calls for use of business methods. With increasing complications of operating a farm business, including income taxes, social security payments and other regulations, it becomes doubly important to deposit income and pay by bank checks.

The U.S. Department of Agriculture lists the following advantages of using checks instead of cash.

1. There is less danger of loss or theft than when carrying money or sending it through the mails.
2. Checks are more convenient than money except for small amounts.
3. The canceled check, though not a receipt, is good evidence of payment.
4. It is much easier to keep records when checks are used.
5. When not being used by the depositor the funds can be employed by the bank for loans to others.

The University of Vermont, in advice to homemakers includes the following:

7. Checking accounts establish credit rating after one's checks previously have been accepted as cash.
8. Checks can usually be sent safely by mail.
9. Bills can be paid by mail and thus save time and travel.
10. Checks are a convenient way of paying or of acquiring cash where one's "bank standing" and identity are known or established.

Young farmers especially need to be advised to start on a business basis.

Endorsements give a further record of transactions. When qualified they --

(A) Restrict payment to certain people --

Pay to the order of John Doe

(B) Do not guarentee payment --

Without recourse - Henry R. Smith

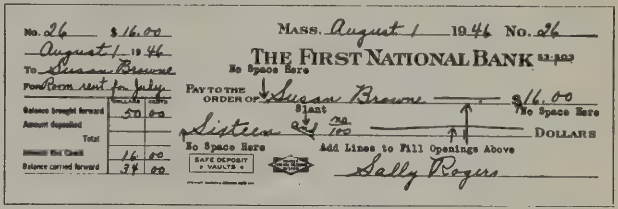
(C) Protect against loss or theft --

Pay to the First National Bank, Liberty, Colo.
for deposit only, Henry R. Smith

WRITE CHECKS CORRECTLY

Few people write checks in a way to give them the most protection. The rules are simple -- follow them.

1. Write plainly and in ink.
2. Fill out stub first -- so you don't forget.
3. Date each check.
4. Number checks consecutively.
5. Do not make checks payable to cash.
6. Show for what the check is given -- for your records and as receipt evidence.
7. Never sign a check in blank -- if lost or stolen any amount can be filled in and you will have to pay.
8. Do not make corrections on checks -- destroy and make a new check.



No. 26 $16.00
August 1 1946
To Susan Browne
For Room rent for July

	Dollars	Cents
Balance brought forward	50	00
Amount deposited		
Total		
Amount this Check	16	00
Balance carried forward	34	00

Mass. August 1 1946 No. 26
THE FIRST NATIONAL BANK
No Space Here
PAY TO THE ORDER OF Susan Browne $16.00
Slant
No Space Here
Sixteen and 00/100 DOLLARS
No Space Here
Add Lines to Fill Openings Above
SAFE DEPOSIT VAULTS
Sally Rogers

Correctly Written Check

U. of Vermont
NEC9

9. Completely fill each line -- start at extreme left for each item. Draw a bold line in any blank space.
10. Be sure the written amount and the dollars in figures are the same.
11. "Avoid flourishes in your signature. A simple, legible signature is harder to forge.
12. Always sign your name exactly the same way on each check.

Test your check writing. With the above rules before you score some of your cancelled checks. How many of the rules do they violate?

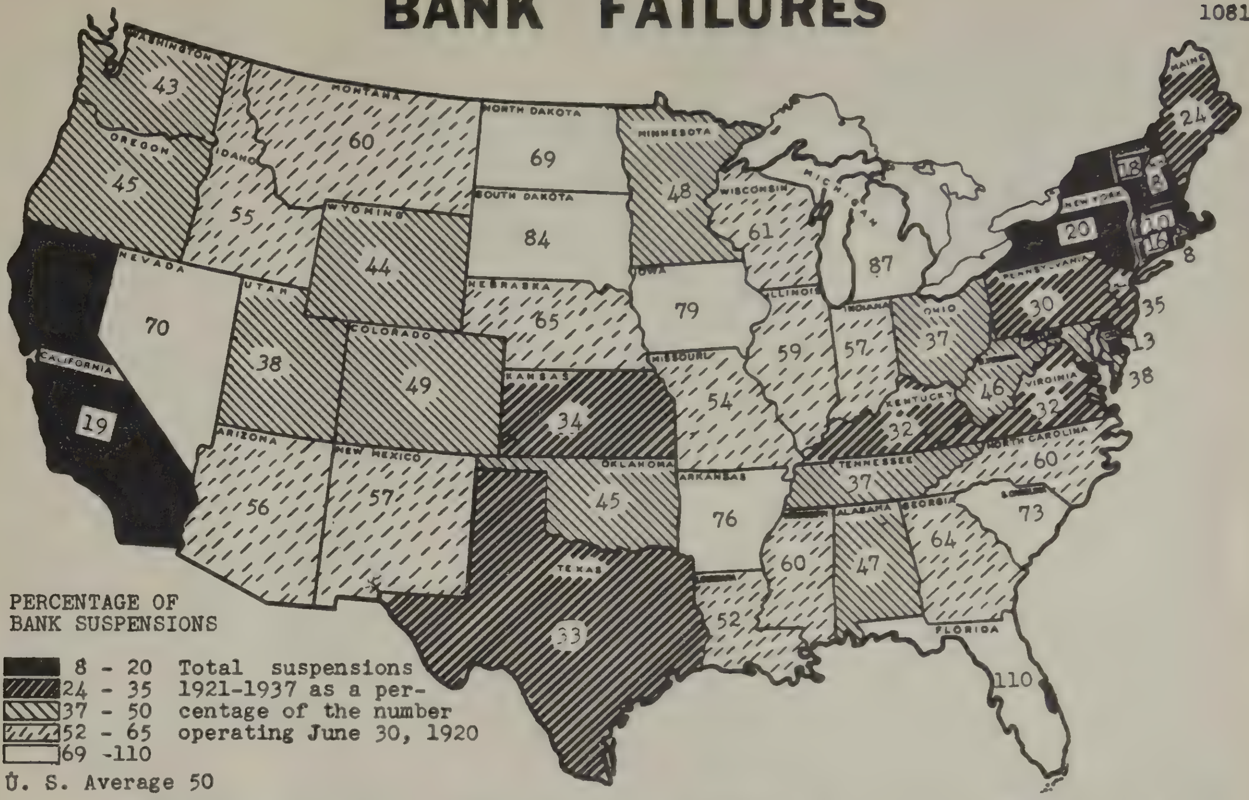
SAVE AND INVEST

For financial independence and security follow a well planned savings and investment program. See the "American Farm Way Life Program", Digest pages 595 and 596.

Banks and other financial institutions stand ready to help you with your savings and investment program. Most of this advice is free ☞ use it.

Spending is easy -- only the thrifty who set goals ahead, make dependable progress. It is your bulwark against bad times and other emergencies. Other goals are old age security, comforts, leisure, education for the children, a home, and lack of financial worries.

BANK FAILURES



The highest percentage of bank failures occurred in rural areas. The densely populated states with strong urban influences on both the east and west coasts had the smallest percentage of bank failures. Some mid-west states with a large urban population like Michigan, Indiana, and Illinois had a high proportion of bank suspensions. Nearly 9,000 of the 15,014 bank suspensions occurred during the four years 1930 to 1933 inclusive. Thus all but about 6,000 of the banks failed in four of the 17 years.

During the boom years preceding 1920 there was a mushroom growth, particularly of state banks in the newer farming territories. In Nebraska, for the ten years, 1910 to 1920, state banks increased from 644 to 1012. This was an average of a new bank every ten days.

Studies show a close relationship between excessive banking facilities and bank failures. Failures tended to be highest where there were a large number of banks in relation to population.

Analysis of bank failures by states often shows distinct territorial differences. Type of farming apparently exerts a major influence. In Texas, four type-of-farming areas, including both farm and ranch areas, for selected years, had less than 5 per cent bank failures, while six type-of-farming areas had 19 to 34 per cent.

Unfortunately, research on this question has not enabled the drawing of definite conclusions regarding the effect of personnel on the credit record of communities.

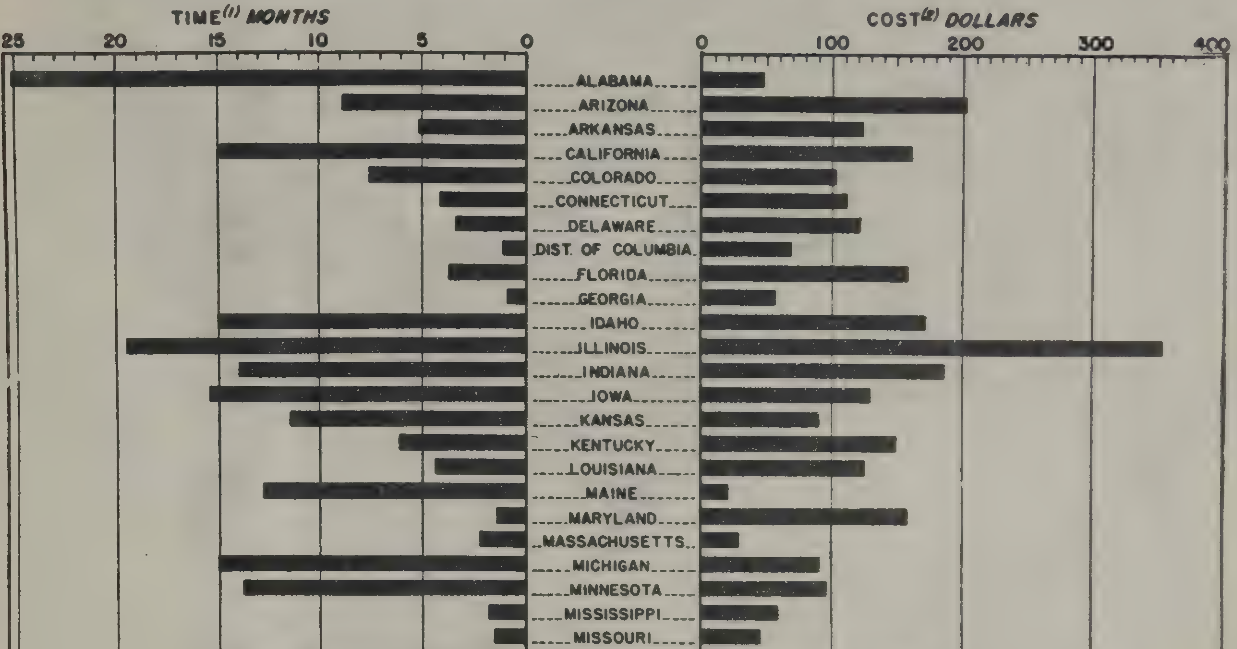
A smaller percentage of national than state banks failed.

	Number June 30, 1919	Number Suspended January 1, 1920 to June 30, 1932	Suspensions As A Percentage Of The Number Operating June 30, 1919
National Banks	7,765	1,502	19.3
State Banks	21,255	8,601	40.5
Total	29,020	10,103	34.8

Regardless of the cause of bank failures and the class of banks that fail, it is important to know the communities that are financially most dependable. Sales, collections, and security of loans are vitally affected, and prudent business will watch such indicators of financial stability.

Based on data of B.A.E. of U.S.D.A.,
U. of Nebraska, and Texas Agr. College

FORECLOSURES: AVERAGE TIME REQUIRED TO COMPLETE COMPARED WITH AVERAGE COST BASED ON H. O. L. C. EXPERIENCE



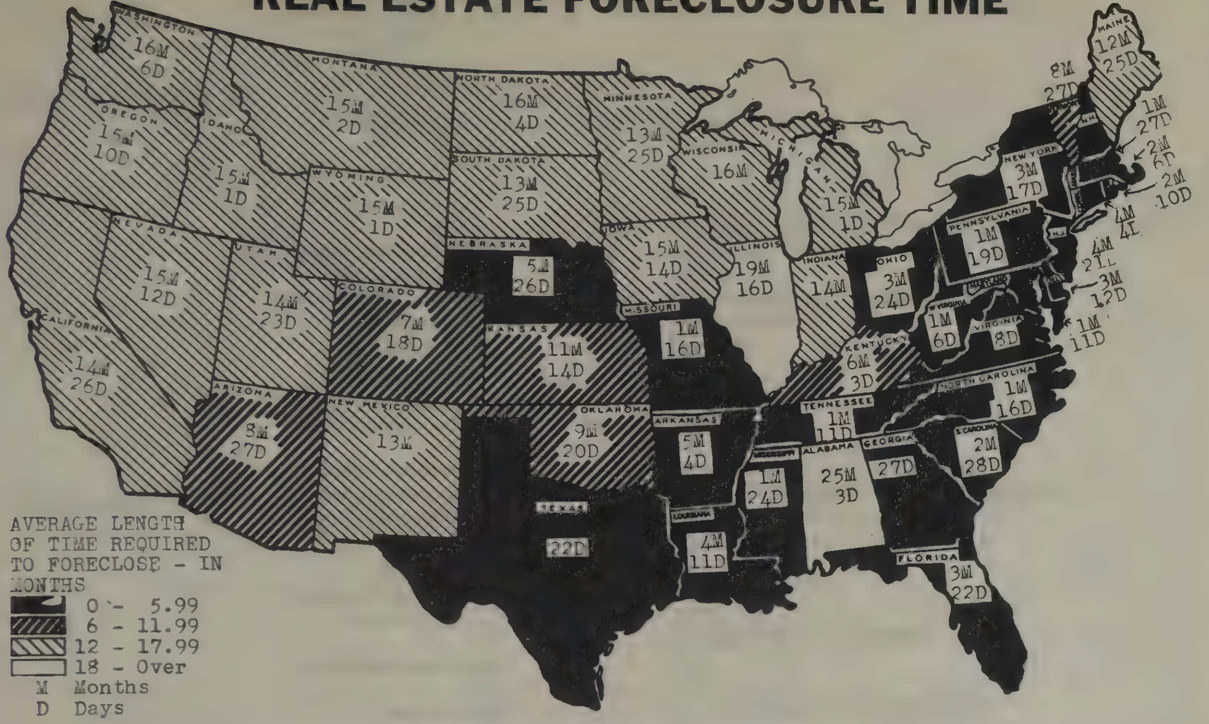
[1] In case of foreclosure in court, the time has been computed from the date of the filing of the petition to foreclose to the date of acquisition of title, free of all rights of redemption.

In case of foreclosure under power of sale contained in the mortgage or deed of trust, the time has been computed from the date of the first publication of notice of sale or of intention to foreclose, where such is required, to the date of acquisition of title, free of all rights of redemption.

[2] Costs do not include salaried personnel in Texas, Massachusetts, Delaware, District of Columbia and Rhode Island. In Louisiana, Nevada, and Oklahoma foreclosure work is partially done by salaried personnel.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

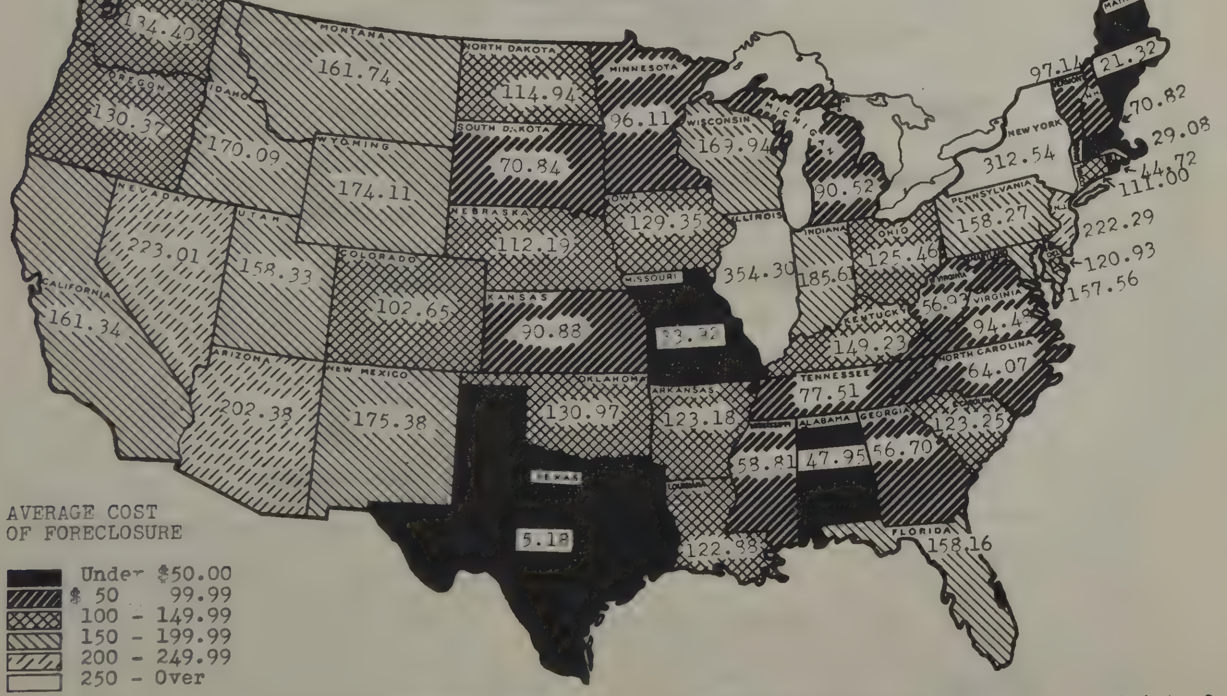
REAL ESTATE FORECLOSURE TIME



In case of foreclosure in court, the time has been computed from the date of the filing of the petition to foreclose to the date of acquisition of title, free of all rights of redemption.

In case of foreclosure under power of sale contained in the mortgage or deed of trust, the time has been computed from the date of the first publication of notice of sale or of intention to foreclose, where such is required, to the date of acquisition of title, free of all rights of redemption.

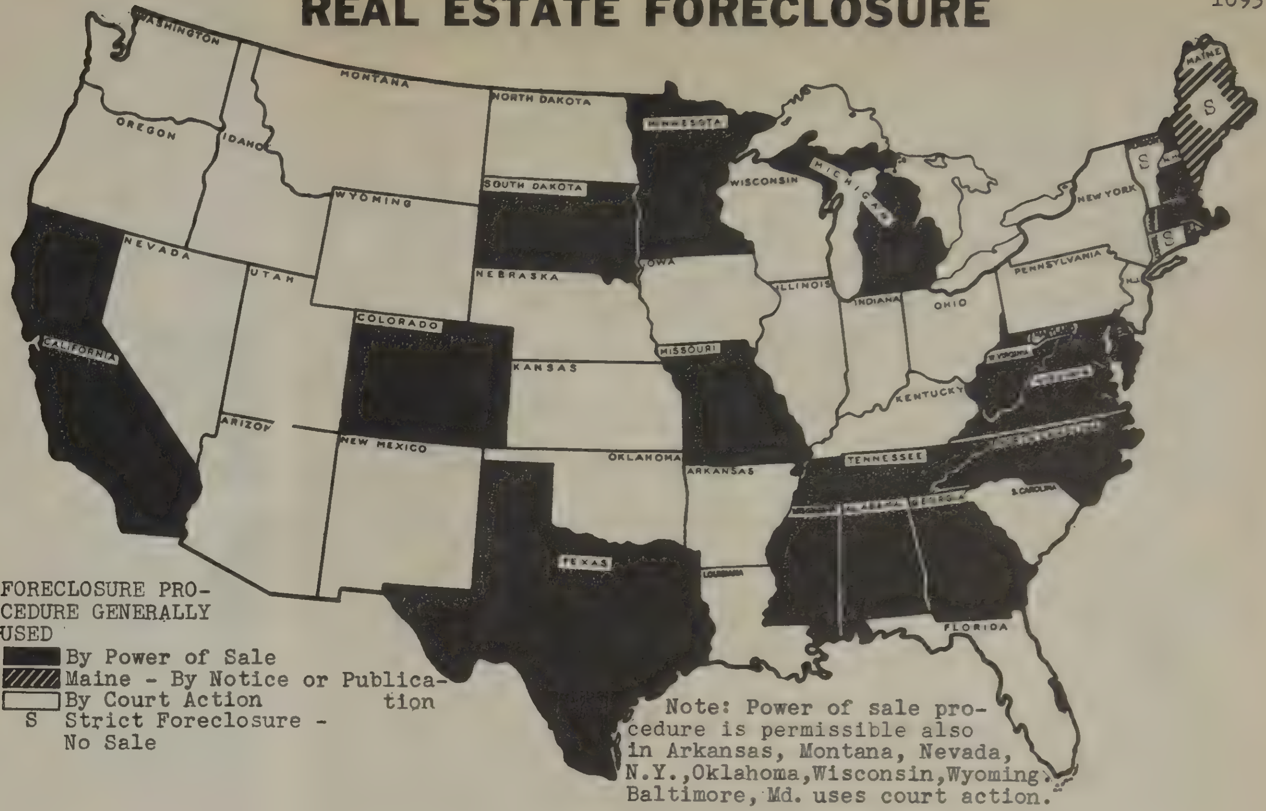
FORECLOSURE COST



Costs do not include salaried personnel in Texas, Massachusetts, Delaware, District of Columbia, and Rhode Island. In Louisiana, Nevada, and Oklahoma foreclosure work is partially done by salaried personnel.

Based on H.O.L.C. Experience

REAL ESTATE FORECLOSURE

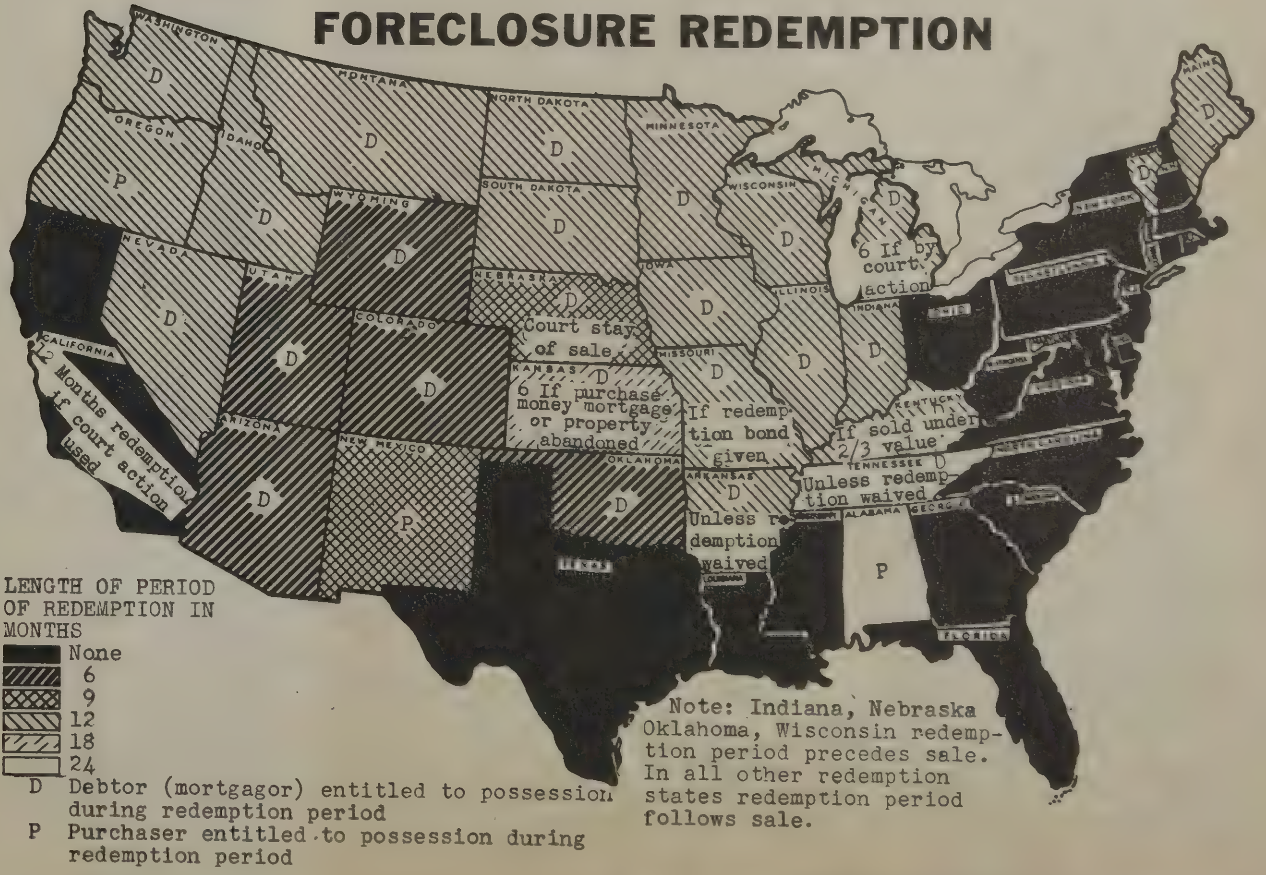


FORECLOSURE PROCEDURE GENERALLY USED

- ■ By Power of Sale
- ▨ Maine - By Notice or Publication
- ☐ By Court Action
- S Strict Foreclosure - No Sale

Note: Power of sale procedure is permissible also in Arkansas, Montana, Nevada, N.Y., Oklahoma, Wisconsin, Wyoming. Baltimore, Md. uses court action.

FORECLOSURE REDEMPTION



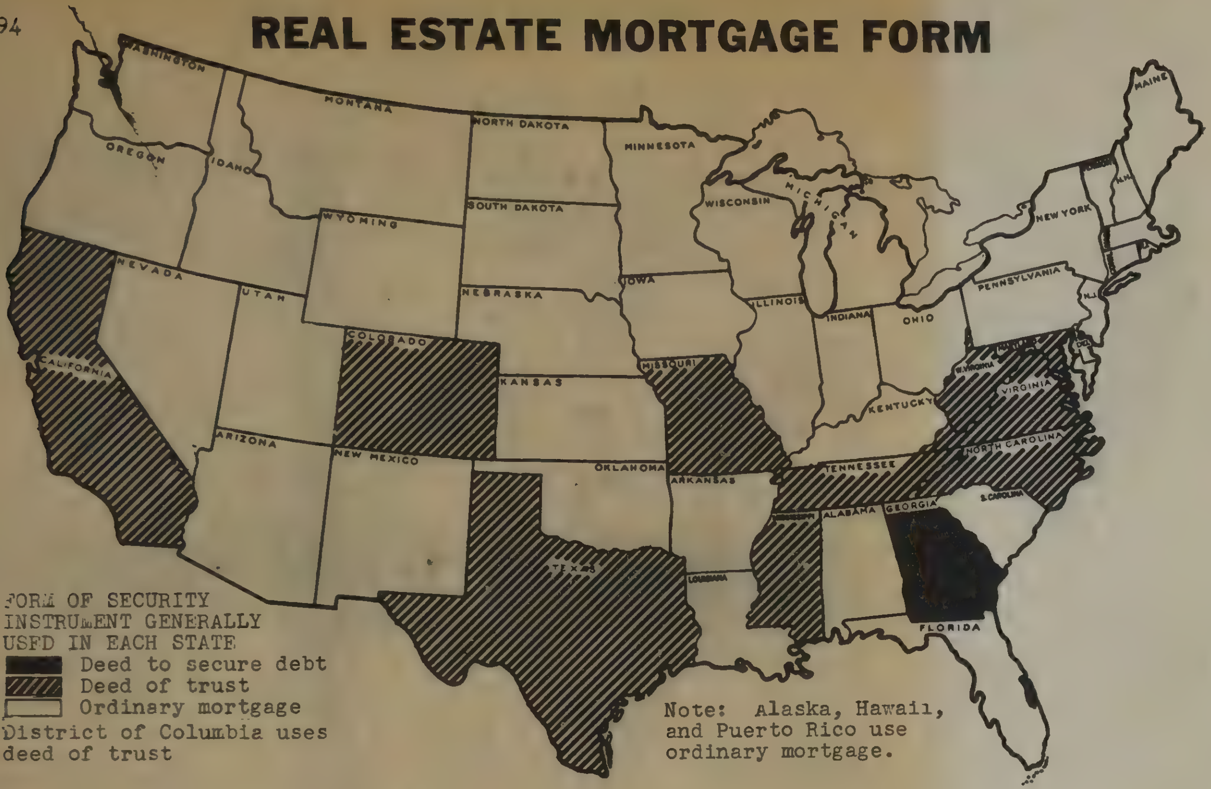
LENGTH OF PERIOD OF REDEMPTION IN MONTHS

- ■ None
- ▨ 6
- ▦ 9
- ▧ 12
- ▨ 18
- ☐ 24
- D Debtor (mortgagor) entitled to possession during redemption period
- P Purchaser entitled to possession during redemption period

Note: Indiana, Nebraska Oklahoma, Wisconsin redemption period precedes sale. In all other redemption states redemption period follows sale.

Based on H.O.L.C. Experience

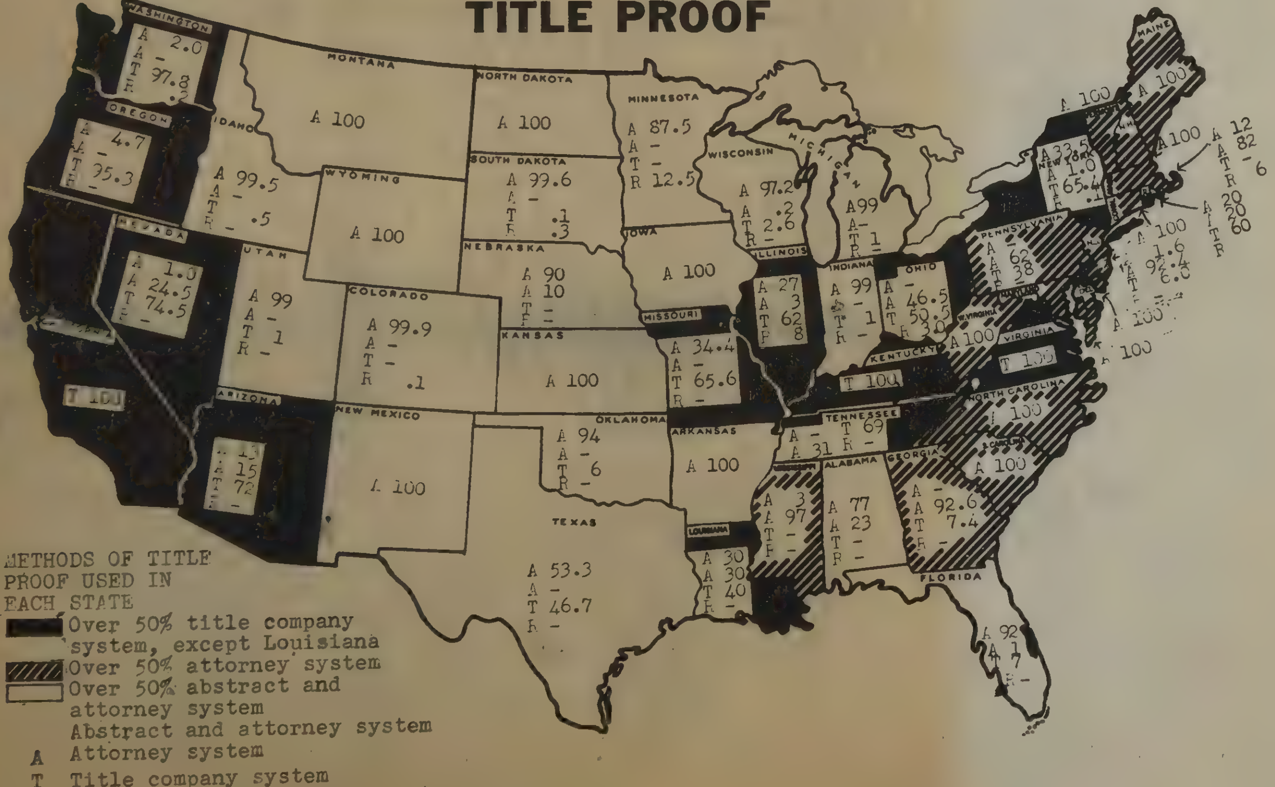
REAL ESTATE MORTGAGE FORM



FORM OF SECURITY
INSTRUMENT GENERALLY
USED IN EACH STATE
■ Deed to secure debt
▨ Deed of trust
☐ Ordinary mortgage
District of Columbia uses
deed of trust

Note: Alaska, Hawaii,
and Puerto Rico use
ordinary mortgage.

TITLE PROOF



METHODS OF TITLE
PROOF USED IN
EACH STATE
■ Over 50% title company
system, except Louisiana
▨ Over 50% attorney system
☐ Over 50% abstract and
attorney system
Abstract and attorney system
A Attorney system
T Title company system
R Land title registration system
Figures indicate per cent of H.O.L.C. loans in each state closed under each system

Based on H.O.L.C. Experience

1100 General Economics

1100 General Economics

DOANE AGRICULTURAL DIGEST
Facts and Opinions From the Oldest and Largest Organization Engaged in Farm Management, Rural Appraising and Agricultural Research.

THIS MONTH IN AGRICULTURE

From Washington --

HELP FOR DROUTH AREAS in the Southwest has been announced. Aid to farmers will be emergency loans at 4 percent for buying feed and other farm supplies. A special emergency fund of 8 million dollars has been allotted for making government feed supplies available at bargain rates. Railroads have agreed to haul feed at reduced freight rates. Relief arrangements are to be handled by a committee in each county, headed by the PMA chairman. ☞ At best, government help can only be a temporary aid measure. Where recent rains have helped soil moisture, short season forage and hay crops should be planted if other crops have failed or are in poor condition.

WHEAT MARKETING QUOTAS HAVE BEEN PROCLAIMED on the 1954 crop. They must be approved by 2/3 of the wheat growers to become effective. The law requires that a referendum be held by July 24 but pending legislation could delay it until August 14. Size of quotas has not been announced. The law would fix allotment at 55 million acres but Congress is working to increase it.

NO NEW FARM PRICE SUPPORT PROGRAM is expected to go before Congress this year. Present law runs through 1954. But, ground work is being laid for action next year. At Lubbock, Texas, Secretary Benson told the American Cotton Congress, "The people developed farm programs to help the national economy pull out of depression. . . They developed amendments to help win a war. . . Now we must give our sober attention to developing further imporvements to our programs that will enable farmers to achieve stability, prosperity, and parity of living in the present circumstances."

PRICE SUPPORT FOR 1953 COTTONSEED will be based on 75 percent of May 15 parity with storage loans and purchases on cottonseed and cottonseed products. Loans will be made at $54.50 per ton; purchases at $50.50 per ton. Purchase prices for cottonseed products will be announced later.

COTTONSEED OIL has become surplus. Support prices are so high that it has been priced out of the market. The government owns enough cottonseed oil to make one billion pounds of margarine -- 5 times as much as present government butter stocks. This is why the government support price on 1953 cottonseed crop has been dropped to 75 percent of parity.

MATURITY DATE ON 1952 COTTON LOANS has been extended to July 31, 1954. This gives producers another 12 months to redeem loan cotton. With acreage estimates down 9 percent from last year, → holding a little longer looks like a profitable move.

DISTRESS WHEAT LOANS are to be made in dry areas where wheat can be stored on the ground -- also on wheat held in temporary storage in other winter wheat areas when approved storage is not available. Distress loans are for 90 days -- by then permanent storage must be secured.

GOVERNMENT WILL BUY MORE GRAIN BINS to store CCC grain stocks taken over from the 1952 support program. Old corn carry-over is estimated at about 800 million bushels. How much bin space is purchased will depend on amount of resealing.

New Ideas --

ASPHALT COMPOUNDS will hold grass and small grains on roadsides, terraces and grass waterways until a good stand is assured. One type is an emulsion sold under the trade name TEROLAS which can be sprayed on. The other type is a semi-solid "asphalt mulch". It is dissolved in a liquid that evaporates when exposed to air. Seedings under asphalt always came up 1 to 2 weeks earlier than in check plots at the University of Illinois. The most satisfactory application rate is .2 to .3 gallons per square yard -- costs from 5 to 8 cents per square yard. This is much less expensive than usual cost of straw mulch.

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QUICK TEST SHOWS GRAIN INFESTATION -- A solution of 2 grams hydrated ferric nitrate in 100 mililiters of distilled water can be made up by any druggist, usually costs less than 50 cents a gallon. When 1/2 cup of wheat is placed in a pint of the solution and the pan is whirled to wet all kernels thoroughly, weevily kernels will float and may be easily counted. - No. Dak. Agr. College

CLARK, NEW SOYBEAN announced by USDA and midwest agricultural experiment stations. Ready for general use by 1955, it is adapted to central and southern Illinois and Indiana. This new variety has averaged about five bushels more per acre than either Wabash or Chief. In oil content it averaged higher than other varieties in the southern part of the area. Clark is resistant to frog-eye leaf spot, one of the major soybean diseases on some Corn Belt farms.

NEW TREATMENT FOR KETOSIS in dairy cattle has worked successfully at New York State and Maryland Colleges of Agriculture. The remedy, sodium propionate, has proved non-poisonous and has stepped up milk production and blood sugar in all tests. Expected to be available through veterinary supply houses by mid-summer.

A CERTIFICATE PLAN FOR WHEAT has been proposed after present support law expires in 1954. No allotments or quotas would be in effect. Each producer would receive certificates for a share of his wheat that would be used for food and sell at parity. Wheat used as seed or exported would sell at the market price. The plan would tend to favor those areas where there are few or no substitute crops for wheat.

Worth Reading --

TRACE MINERALS FOR CROPS -- Sulphur, zinc, boron, manganese, cobalt, molybdenum, copper, and iron are most often lacking in soils which have been farmed a long time or which have leached or eroded badly. Manganese has increased soybean yields 3 to 5 bushels per acre. On high lime soils in dry years, iron applied as ferrous sulfate has doubled bean yields. But there's no point in worrying about minor element deficiency until you get all the lime, nitrogen, phosphate, potash, and organic matter needed. Capper's Farmer, July, page 20.

HOW TO BUILD A PASTURE CHAIN. Year-round pasture is the goal of every good Dixie farmer. It should include clover-grass permanent pasture such as white Dutch clover, Ladino, Dallis grass, Kentucky bluegrass or orchard grass; or crops that can be substituted for it, such as coastal Bermuda with white or crimson clover and lespedeza sericea. To complete the program you'll need supplementary summer and winter grazing crops, and legume grazing crops for hogs and poultry. Many southern adapted pasture crops will fit this program. Farm and Ranch, July, page 17 upper south, page 15 lower south editions.

ARE YOUR WATER RIGHTS SAFE? Before investing a large amount for an irrigation system you'll be wise to check your state laws regarding water rights. In the 17 western states water rights are well defined -- irrigation investments are reasonably secure. In the 31 states bordering and east of the Mississippi you can run into trouble. There's less risk if you use water from a pond or well on your land. Where water use is increasing rapidly, new state laws are needed which assign water rights to landowners in the order that they apply for them. Country Gentlemen, July, page 29.

IRRIGATION -- YOUR NEXT BIG STEP TO MORE CORN. Although costs are high, most tests show irrigation will pay if heavy fertilization and a high planting rate are used. An Indiana farmer spent $31 per acre to irrigate corn but had a net return of $105.50 more than on non-irrigated land. A USDA study in Nebraska estimated that irrigation added 30 bushels of corn per acre under average management. Successful Farming, July, page 943.

A POND MAKES A WELL BIGGER shows another irrigation technique. Small wells pumping only 50 gallons per minute can do the same job as the big ones. A pond is used to collect water from the pump and will irrigate 40 to 60 acres periodically. A big help to those who can't afford the large wells or aren't located in an area where they are practical. Farm Journal, July, page 34.

TRASHY PROFITS. Cotton harvested by mechanical stripper is trashy and low grade. But the harvesting cost is low enough that more profit can be made than by hand picking for a higher grade. Samples of cotton picked the same day, from the same field, ginned in the same gin and graded by the same grader showed $10 to $15 more net profit per bale. Progressive Farmer, July, page 38.

BUNKER SILOS: EASY TO BUILD AND FILL -- A new development in silage storage. Bunker silos are above the ground trench silos. They can be built for about $1.30 per ton of storage. Bunkers are easy to build with pressure-treated poles and lumber. Usual size -- 20 to 30 feet wide, 60 to 100 feet long and 6 to 8 feet high. Farm Journal, July, page 30.

THIS MONTH IN AGRICULTURE

From Washington --

TO GET AID UNDER DROUTH FEED PROGRAM, a farmer or stockman must have less than a 30 day feed supply to supplement roughage to maintain his foundation herd. Such feed may also be fed to cattle marketed before October 1, provided they are not feeders in feed lots. Also eligible are farmers and ranchers who do not have the money to stay in business and maintain their herds unless they can buy feed at prices well below the market price.

FEED AT REDUCED PRICES can be bought by farmers and ranchers certified by local PMA committees in drouth disaster areas. Prices are: wheat, $1.10 a bushel; oats, $.50; corn, $1.00; and cottonseed meal and pellets, $35 a ton. The President's emergency fund will be used to help finance the feed supply program. Plans had also been made to sell feed mills government cutrate feeds for distribution to farmers at reduced prices. But this program was cancelled when railroads refused to cut freight rates for feed companies handling this feed.

FARM SURPLUS SEED DISPOSAL program for CCC stocks of hay, pasture and range grass seed aims to relieve surpluses which are adversely affecting future markets.

Provisions are to: → Adjust sale price for ladino clover down to 65 cents a pound as of Nov. 1, 1953. → Offer for domestic sale, up to 50 percent of all stocks of these seeds on hand May 1, 1954, except ladino clover, tall fescue and birdsfoot trefoil. → Offer ladino clover, tall fescue and birdsfoot trefoil seed for sale, but only 50 percent of the acreage used for domestic consumption in 1951, 1952, and 1953.

TWO NEW ASSISTANT SECRETARIES OF AGRICULTURE -- John H. Davis will be responsible for commodity marketing and adjustment activities. He will continue to serve as president of the Commodity Credit Corporation. Romeo E. Short has served since January as director of Agricultural Credit Services and since March as director of the newly created Foreign Agricultural Service. He will continue to be responsible for activities pertaining to foreign trade in agricultural commodities.

NEW CCC ADVISORY BOARD appointed by President Eisenhower. Its function is to study and advise the Secretary of Agriculture on general policies, including sale of commodities, lending and price support programs. The Board is composed of 5 bi-partisan members. Represented are a farmer, banker, seed company executive, cotton trade association executive and an agricultural college dean. They will meet at the call of the Secretary at least once every 90 days.

A NEW 18 MAN FARM ADVISORY COMMISSION will review farm policies and administration of farm programs. The President will appoint the 18 members, no more than 9 belonging to any one political party, and at least 12 being representative farmers. The new group will be permanent, replacing the 14-man iterim advisory committee appointed in December 1952.

DAIRY INDUSTRY REPORTS PROGRESS on self-help program. Fluid milk consumption is up 2.6 percent this year. The committee expects, "a decline in government purchase of surplus butter as milk production decreases and consumption of fluid milk and butter increase." Flexible price supports -- to go up or down to meet changing market conditions -- are being studied. They have been favored by some dairy groups -- opposed by others unless grain supports are lowered.

WHEAT DISTRESS LOANS are now available to farmers in Idaho, Montana, Oregon and North Dakota. Loans are available on wheat stored on the ground or in temporary facilities at 80 percent of price support rate and will run for 90 days.

LOANS ON SAMPLE GRADE WHEAT will be made, provided the grade was caused by low test weight. Sample grade weighs less than 50 pounds a bushel.

FARM CREDIT ADMINISTRATION LAW makes the agency independent of the USDA and gives the farmer a greater voice in its operation. The new law provides for a 13-man farm credit board to be named by the President -- subject to Senate approval.

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New Ideas --

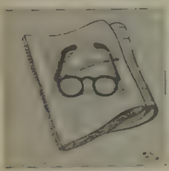
NEW CHEMICAL DALEPHON shows promise of being the answer to complete summer fallowing when used with 2, 4-D. Dalephon kills grasses when applied to foliage, in contrast to the grass killers which work through the roots of grasses. Dalephon has been effective on crab grass, wild oats, old witch-grass, foxtail, and downy brome-grass. Tolerant crops may be planted almost immediately, for the chemical is active in soil for only a short time. (Dow Chemical Co.)

HARDIER ALFALFA -- Vernal, a new superior variety for northern areas, will get a fast build-up in the National Foundation Project. Farmers should be able to buy some seed by 1956. Vernal is more winter-hardy and resistant to bacterial wilt than the popular Ranger variety.

TARNISH-PROOF TURPENTINE with low acid content is now being produced with improved distilling methods and equipment worked out at USDA's Oluster (Fla.) Naval Store Station. Today's gum turpentine will stay sparkling clean in storage. Pine-gum farmers of the Southeast can retain markets worth more than $1 million a year that were threatened by darkening of turpentine.

NEW LACTOMETER DEVELOPED for measuring milk solids. The method involves heating the milk to 102° F -- just above the cow's body temperature -- and reading the lactometer at that temperature. Made of aluminum, it's being tested by the Bureau of Dairy Industry in cooperation with the American Dairy Association and the University of Maryland.

Worth Reading --



SPOT THOSE LOAFERS EARLY. Every cull hen in the flock costs profits of at least one good layer. You can add the profit of 2 birds by eliminating 1 cull by following these simple rules: Cull all the birds with yellow beaks and yellow shanks. Get rid of late maturers, market the last 10 percent to come into production. Remove the weaklings. This is a continuous job beginning with chicks and never-ending with layers. Cappers Farmer, August, page 24.

TRADE MAKES YOU PROSPEROUS. Your income is highest when we have the most foreign trade. During the past 50 years, figures show that farm exports, farm imports, and farm income ride together. Foreign purchases have been around $3½ billion a year. Last year they totaled $4 billion, including more than 40 percent of our wheat, cotton and rice. This year our farm exports will be $3 billion. We have been pretty much of a free trade nation, and as a result, have prospered from the free flow of goods and service within our boundaries. Country Gentleman, August, page 28.

BIG TROUBLE IN MEXICO -- One of the most serious threats to U. S. cattlemen, Foot-and-Mouth disease, cannot be stopped by vaccination, says Dr. L. B. Noyes. Vaccine masks spread of disease, won't reduce number of animals to be destroyed, is slow, and too costly. Farm Journal, August, page 29.

WHAT WE KNOW ABOUT ANTIBIOTICS IN SWINE FEEDING: The most effective antibiotics, aureomycin and terramycin, increase growth rate of fattening pigs up to 15 percent. Greater benefits are obtained by runts, pigs on poor rations or with digestive disorders, but greater actual gains are made by healthy pigs on good rations. Antibiotics should be used with well balanced rations, not as a substitute for them. Farm and Ranch, August, page 16 or 17.

KEEP 'EM GAINING ALL THROUGH AUGUST. Summer slump in beef cattle gains can be corrected by having good pasture. Top dressing, rotation, clipping weeds, and grain feeding are some of the ways to counteract summer slump. Successful Farming, August, page 30.

HERE'S ONE WHEAT PROBLEM YOU CAN SOLVE. Winterkilling of wheat is one of the most exasperating problems -- especially when farmers face acreage allotments and marketing quotas. Balanced fertility will go a long way to prevent it. Be sure plenty of nitrogen, Phosphorous and Potassium are present. Don't wait until spring to apply P & K. It will be too late. Successful Farming, August, page 50.

YARDSTICK FOR TENANTS -- Landlords are getting more choosy about their tenants. Many now require several years' experience, more than a grade school education, age 21 to 40, a machinery investment of more than $2,000, and ability to borrow up to $14.50 per cultivated acre. Owners are becoming more favorable however, to tenant ownership of livestock, poultry and dairy cows. Progressive Farmer, August, page 20.

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SEPTEMBER 1953

THIS MONTH IN AGRICULTURE

From Washington --

SHORT TERM AMORTIZATION ON NEW GRAIN STORAGE built between January 1st, 1953 and January 1st, 1957 is now allowed. This means you can depreciate for income tax purposes the cost of new buildings in 5 instead of the usual 20 years. Those eligible to take advantage of this ruling are: any farmer who builds a permanent crib or bin for grain storage or any elevator or warehouse equipped for handling grain. For more detail, see your Internal Revenue agent.

NO EXPORT SUBSIDY ON 1953 COTTON. Secretary Benson's statement: "Since it is our carefully considered opinion than an export subsidy is not a solution to our cotton export problem under present conditions, I have determined that the Department of Agriculture will not institute an export subsidy on cotton during the ensuing year."

GRAIN STORAGE BUILDING is being pushed by USDA. Storage use guarantees will be made to responsible commercial firms including cooperatives, to encourage additional commercial storage construction -- for wheat, corn, rye, oats, barley, sorghums, flaxseed and soybeans. Guarantees will be limited to newly constructed permanent type commercial elevators, new additions to existing plants, and conversion of existing plants to commercial use. PMA will process applications, which will be accepted until June 30, 1954 (temporary deadline September 30, 1953). Considering the wheat referendum vote and attitude of Congress, USDA plans to prepare for huge annual surpluses.

NO CCC WHEAT BEING SOLD FOR EXPORT UNDER LOAN RATE. Wheat now held by the CCC is available for export -- but only when the domestic market price is higher than the current loan rate plus 5 percent and reasonable carrying charges. The only exceptions to limits on export sales will be for emergency programs and to avoid losses from deterioration.

COVER CROP, HAY AND PASTURE SEED held by CCC will not be sold. Offers to sell these seeds for export have been withdrawn. These seeds were to be sold on a negotiated price basis. They were acquired by CCC, 23,217 pounds, in its price support operations.

SPECIAL LIVESTOCK LOANS will provide emergency credit to producers and feeders of cattle, sheep and goats temporarily unable to get needed credit from banks or other lending agencies. You must have a good record of operations and reasonable prospects. You may use the loan for just about any purpose -- from paying for livestock feed to paying the insurance premiums. Loan applications will be handled by Farmers Home Administration in your county. Interest at 5 percent.

MIXED FEED IS INCLUDED AGAIN in the emergency drouth program. CCC corn and cottonseed meal will be made available to feed mixers and distributors at prices low enough so they can sell to farmers in drouth disaster areas at even lower prices. The program is similar to the one proposed earlier until the railroads balked at reducing freight rates 50 percent for shipping CCC owned feeds to feed mixers. In effect CCC is reducing the price of feed to the feed mixers. Under the new program it is possible to buy a feed mix of 50 percent corn and 30 percent cottonseed meal.

HOUSE AND SENATE AGRICULTURAL COMMITTEES ON COUNTRY-WIDE TOUR. The Senate Committee will hold hearings on grazing policies and range improvements in national forests at Salt Lake City, September 15 and Helena, Montana September 17. The House Committee in their quest for "grass roots" opinion on agricultural policy will hold public meetings as follows: September 21, Bristol, Va; September 24, Valdosta, Ga; October 10, Bloomington, Ill.; October 12, Indianapolis, Ind.; October 13, Enid, Okla.; October 14, Des Moines, Iowa; October 16, Watertown, S. Dakota; October 17, Minneapolis, Minn.; November 2, Cheyenne, Wyo.; November 4, Billings, Montana; November 5, Pendleton, Oregon; November 7, Santa Rosa, Calif.; and November 12, Whittier, California.

WHEAT GROWERS IN WESTERN STATES can get permission to grow wheat on excess land for wind-erosion protection. The marketing quota program has been amended to permit producers in wind-eroding areas, who have prepared more land for wheat output than the quota allows, to seed it to wheat for green manure, cover crops and hay only. County PMA approval needed.

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New Ideas --

"NEBULIZATION" WILL CONTROL NEWCASTLE, says Dr. C. P. Johnson, animal pathologist at Virginia Agricultural Experiment Station. Chicks are treated in the box when removed from the incubators. The box is covered by a cellophane hood. Forced air from an electric paint-spray pump operates the nebulizer, giving about 4 pounds of pressure per square inch. A group of 100 day-old chicks can be vaccinated with B_1 virus every 2 minutes. The vaccine will soon be available commercially in the proper strength for nebulization. The cost of the pump is about $40, the nebulizer about $3 and the hood not over $5. For more information write Dr. E. P. Johnson, Virginia Polytechnic Institute, Blacksburg, Virginia.

SOIL CONDITIONERS permit establishing permanent tobacco plant beds. Results of 2 years of field tests in Kentucky with Krilium (Monsanto Chemical Co., St. Louis) show that the crop gets off to an earlier start, with loss of fewer plants in treated soil. Loss of plant nutrients and water in transplanting is less as treated soil tends to crumble easily, holding few root hairs of the plant. From 5 to 25 percent less replanting was necessary where plants from treated beds were used. Ten pounds of soil conditioner was applied in each plant bed (19 x 100 ft.).

NEW COTTON CLEANER for gins has been devised. The recipro-cleaner has taken out about twice as much trash and foreign materials as any other gin stand cleaning equipment in use. This device is built in as a part of the gin stand commonly used in all upland seed cotton ginning. No additional machines are required for this operation and little additional power is needed. The new cleaner works equally well with any type of rough-harvested seed cotton with no harmful effects on qualities of the cotton fibers -- patented by USDA.

OSAGE, new potato variety developed for the North Central region, promises to out-do the old standby, Irish Cobbler. In Osage the main shortcomings of the Cobbler have been eliminated. Higher resistance to potato scab, higher percentage of marketable tubers, and higher yields have been shown. The tubers are smooth and oblong in shape. Lower loss from paring and cooking quality compared favorably with Cobbler -- Iowa Experiment Station.

A NEW TYPE CORN HARVESTING MACHINE is now on the market. It cuts the stalk just above the ground, takes the stalk and ear into the machine, snaps the ear from the stalk, and then shreds the stalk. The machine has two main advantages: 1) no shelled corn is wasted by snapping rolls, and 2) tillage operations are saved since stalks are shredded at harvesttime. Nebraska Agricultural Experiment Station tests show that shelled corn on the ground averages slightly over 5 percent of the total corn crop. Shredded stalks can be used for bedding or if corn is harvested early the stalks can be made into silage. (J. I. Case Co.)

Worth Reading --

(Briefs of the month's best reading from farm mazagines of over 1 million circulation.)

HOW DO WE LOOK from the city? In 1900 farmers made up 1/3 of the population. Today their proportion is only half as much. In public opinion polls more than half of the people at times have "had it in" for big business or organized labor. But seldom have over 10 percent of the people expressed any real hostility toward the American farmer. The public relations position of the farmer is good, being thought of as "little guys" by others. Until the farmer becomes a "big operator" or appears to be acting against the public interest he is safe from city hostility and anti-farm legislation. Successful Farming, September, page 37.

GROW YOUR OWN FERTILIZER WITH COVER CROPS. Dr. Frank App, of Seabrook Farms in New Jersey, has found that an acre of unfertilized clover holds 6,000 pounds of dry matter in its roots and tops. In commercial fertilizer terms, this equals one ton of $14\frac{1}{2}$-$4\frac{1}{2}$-20, valued at $52.28. The seed cost $5.98; the gain, not counting the labor of seeding, is $46.30. For analysis, nitrogen is valued at $.13 a pound, phosphate $.06 and potash $.04. A cover crop will also maintain calcium and magnesium in the soil, prevent erosion and increase tilth. Good cover crops seeded in the fall are crimson clover, rye grass, wheat, rye, barley and vetch. Country Gentlemen, September, page 40.

WHAT WILL BANKERS SAY -- when you see them about a loan this fall? You'll still be able to borrow money at most banks for the full purchase price of cattle. Other banks will loan 50 to 75 percent. Newcomers will find feeder loan money hard to get. Most bankers will base outlook on corn loan levels and probable fat cattle price next year. Many think fat cattle will bring $20 to $25 then. So, in order to have a satisfactory working margin of $5 to $7, feeders will have to be bought for 15 to 18 cents. In many cases, interest will go up to 6 percent. Farm Journal, September, page 31.

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THIS MONTH IN AGRICULTURE

From Washington --

WHAT IS A FARMER? Corn means one thing to a hog, another to a jokester and still another to a bootlegger. So it is with farmers and folks who talk about farmers. For instance: Is a man a farmer who lives with his family on a farm? No, because 1/6 of all farmers, according to the census, had no income from their farm. On the other hand, if a farmer is a man who makes most of his money from farming, only 1/2 the so-called farmers are real farmers.

Maybe the only farmers are operators and owners who make all their money from the farm. Then 1/3 of all farmers reported in the census or 5 percent of the U.S. population are actually farmers. Another 1/3 of the farmers receive more than half of their income from sources other than the farm.

WIDE PRICE DIFFERENCES have been reported in beef price survey. This difference in price between high and lower grade cuts of beef seems to be reasonably consistent with the wider than usual spread in prices of high and low grade cattle. The wide spread in cattle prices was brought about by unusually heavy marketing of lower grades of cattle due to drouth. This preliminary survey was requested of USDA by Secretary Benson.

"SHOW WE MEAN BUSINESS" said President Eisenhower to Secretary Benson in writing a new water conservation policy for the nation. The President has recommended that appropriations for upstream watershed operations be increased above the current level of 5 million dollars in fiscal 1954. The upstream conservation program is based on the theory that flood damage can largely be prevented by controlling water in upper reaches of the small tributaries to large rivers. Managed watersheds also prevent heavy soil erosion.

PRICE FIXING IS NOT THE ANSWER -- The number of states with milk price-fixing laws has been reduced from 26 to 12 in recent years. Price fixing is not doing the job expected of it. It insures the producer a price for his product but it does not insure that anyone will buy the product. Many groups have contended for 16 years that fixing prices by a milk commission is an attempt to control interstate commerce. When supply and demand do not set the price and Uncle Sam does not buy the surplus to give away overseas, then price fixing creates the surpluses we are now concerned about. Who is injured? Why the producer of course -- he is losing a market for his product.

BURLEY TOBACCO allotment is down 8 percent. This would indicate a marketing quota of 526 million pounds or an acreage allotment of 395,500 compared to 432,750 acres alloted in 1953. Farms in Ohio, Tennessee, North Carolina, Virginia, Kentucky, West Virginia, Indiana and Missouri will be affected.

FLUE-CURED QUOTAS indicate a slight increase in over-all acreage, but quota per farm will remain about the same in 1954 -- 1,057,000 acres, an increase of 12,500 acres over 1953. Farmers in Florida, Alabama, North Carolina, Georgia, South Carolina and Virginia will be affected.

Next Month --

NEW REGIONAL EDITIONS for the Corn Belt, West, South, and North & East will begin January 1. You will continue to receive nationwide coverage with interpretations for your farming area.

SOILS AND CROPS -- A new bi-monthly page designed to keep you posted on the latest management and outlook for crops, fertilizers and machinery in your region.

MOTOR OIL BUYING GUIDES -- What the letters and numbers on motor oil mean; what types to use for best service.

1954 POULTRY OUTLOOK -- Prospects for poultrymen and how to make money on layers and broilers next year.

This material is based on factual information believed to be accurate but is not guaranteed. (Printed in U.S.A.)
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New Ideas --

ATROPHIC RHINITIS may be controlled by a recent clue -- isolating an agent causing the disease -- leading to a better understanding of this swine disease. The agent associated with atrophic rhinitis is found in connection with other diseases of swine such as peritonitis, pericarditis, pleuritis in pigs and in arthritic points. Some of the pericarditis and arthritis blamed in swine erysipelas may have been infectious atrophic rhinitis. The disease probably has been around for 35 years. It is so widespread that if you sell your infected hogs you may buy other infected ones. Sanitation and rigid culling may hold it in check until more is learned through research -- Iowa State College.

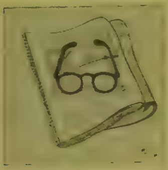
IMMEDIATE IMMUNITY FROM HOG CHOLERA is now possible by implanting crystal violet vaccine and serum in the skin of the lower third of the pig's ear and administering other serum under the skin. Long-time immunity from vaccination is not lost in preliminary tests by USDA Bureau of Animal Industry. Tests are still in the experimental stage.

FRESH CONCENTRATED MILK -- Pilot operation in production and distribution has been carried out by the Dairy Industry Department, Iowa State College. Concentrated milk is not new, but to market it in rural areas in competition with the family cow is. Marketing experiment has been successful for more than a year. American Milk Review says, "A frontal attack onthe most pressing problem of the dairy industry."

NATIONAL POULTRY TESTING PROGRAM has been proposed to provide a reliable test of egg and meat strains of chickens. Birds to be tested would be selected at random rather than having breeder select his best birds for testing. This program, recommended at 1952 National Poultry Improvement Plans Conference, would supplement state and regional tests. It is hoped the national testing program will be sponsored jointly by the poultry industry, state experiment stations and USDA. The poultry industry would raise funds for the new plant and USDA would pay the operating expenses.

WHAT SIZE POTATO does the housewife want? Ninety percent of 2400 persons interviewed in retail stores chose potatoes between 2 1/4 and 3 1/4 inches in diameter. Quality is the determining factor in buying. The problem of consumer acceptance and preferences for potatoes comes in for special study by USDA in a high-supply, low-price year.

Worth Reading -- (Briefs of the month's best reading from farm magazines of over 1 million circulation.)



HOPE HEARINGS: The House Agricultural Committee will probably push for high-price supports next year. Many people doubt that the House hearings were representative of general farm thinking. In the Midwest and West, Farmer's Union members testified out of proportion to their representation of farmers. Many wonder too about the value of the hearings -- this will be determined by the relative weight Congress gives the House Committee recommendations. Farm Journal, December, page 14.

HOW TO PICK A DAIRY COW -- You should be able to answer these questions: Has this cow the natural inclination and the capacity to be a high producer? If so, does she have a weakness that may cut short her productive life span? Production and long life depend upon dairy character, capacity, correct udder, feet and legs. In everyday language she must be lean and sharp with well-sprung ribs in a deep body, udder attached high and wide behind carrying well forward, straight wide hocks, short pasterns, and deep heel. If she cannot pass this test, chances are she will not be profitable for you. Well illustrated in color. Country Gentlemen, December, page 24.

HOW TO GET -- AND KEEP -- FARM HELP. Today the farm assistant, handling thousands of dollars worth of your equipment, can do more in one day than a man in 1900 could do in a week. You can offer a farm assistant 3 things: A cash income, housing and food, and the pleasure of farming. A profit-sharing plan -- in writing -- based on gross receipts is preferable. Make your assistant a part of the farming operation. Plan with him. Basically $175 a month, house, milk, meat, eggs and garden will equal $360 in town. Cappers Farmer, December, page 17.

WAYS TO MAKE FARMING PAY IN 1954. Net profit rather than volume counts. Reports from 27 master farmers advise: Spend more time in planning and marketing. Do more repair work at home. Join farm organizations. Two-armed farming -- crops plus livestock -- will solve most of the problems. Put into practice those things you already know. Progressive Farmer, Dec., page 18.

HAY OR SILAGE CAN CUT YOUR WINTER HOG-FEED BILL. Roughage is the key to lower costs and healthier pigs. Growing hogs can make good use of 15 percent sun-cured alfalfa in dry lot ration, tests at Wisconsin show. Roughage can make up 45 percent of the ration of bred gilts and sows. Pigs weaned per sow and weights can be increased by adding roughage to the ration. Successful Farming, December, page 33.

THE UNITED STATES FACES FOOD SCARCITY?

The present problem of excess agricultural production obscures the fact that the national trend is definitely toward acute food shortage. This may be accelerated by the current wars. The world and even this nation could quickly come to a basis of famine and semi-starvation. Some anticipate such conditions within one to two years.

The only reason we have food surpluses in this nation now is because millions of people are now and have been for at least 8 years on very inadequate diets - semi-starvation in many cases. This nation with all of its productive capacity and wealth is said never to have produced an adequate diet for all of the people. "The consumption of at least 10 to 20 per cent more milk, 10 to 25 per cent more butter, 25 to 70 per cent more tomatoes and citrus fruits, and about twice as much of leafy, green, and yellow vegetables would be advantageous to the nutrition of our population." (Hazel K. Stiebeling, Senior Food Economist, B. of H.E., U.S.D.A.)

The following are the realistic facts. With a stabilizing production and an increasing population the amount produced per person has been declining at a very rapid rate for most of our basic food commodities. Here are some comparative figures for the past 25 years:

PER CAPITA FOOD PRODUCTION CHANGES

	Pounds Per Capita 1911-15 Production	Pounds Per Capita 1935-39 Production	Per Cent Increase	Per Cent Decrease
Beef	64.5	53.6		17
Veal	6.4	7.8	22	
Lamb and Mutton	7.1	6.8		4
Pork	73.0	56.7		22
TOTAL MEAT, Excluding Lard	151.0	124.9		17
Lard	17.0	12.6		26
Corn, Oats, Barley, Grain Sorghums	1987.0	1392.0		30
Wheat, Rye, Buckwheat, Rice	537.0	394.0		27
Eight GRAINS, Totals	2524.0	1786.0		29
POTATOES (Including Sweetpotatoes)	253.0	206.8		18
Beans, Dry Edible and Peanuts	12.8**	20.5	60	
VEGETABLES - Fifteen (1919-21)	93.0**	146.6	58	
FRUITS - Thirteen (1919-21)	132.1**	191.6	45	
SUGAR, Cane (Chiefly Raw)	5.0	7.0*	40	
Beets (Chiefly Refined)	16.0	19.0*	19	

On a per capita basis the production of the principal meats has declined 17 per cent and the production of the major crops 29 per cent in the past 25 years.

Since a large proportion of the major grains is ultimately consumed as meat and livestock products, it appears that the net decline per capita of the bread and meat foods has been about 1 per cent per year for the past 25 years.

Every year since 1927 the United States has consumed as much or more beef than it has produced.

The per capita production of potatoes has declined almost 1/5, or about 3/4 per cent per year.

There have been increases in vegetables and fruits - 113 pounds per capita. This does not go very far in offsetting the 738 pounds per person reduction in the eight grains. Fresh fruits and vegetables normally contain from 60 to 90 per cent water.

United States sugar production has increased. Home production and normal imports should apparently provide us with almost any reasonable amount desired.

Some of the decline in production per capita has been offset by reduced exports. If the nations at war start taking even moderate food supplies from this country the surpluses will rapidly disappear.

Another alleviating factor that is permanent is the decrease in horse and mule numbers.

The acreage equivalent of both reduced exports and the decrease in horses and mules is less than one acre per capita. (See Digest Page 23) This, therefore, could not offset more than one-half of the decline in major foods per capita.

Per capita consumption has also been declining as is shown by the following figures:

PER CAPITA CONSUMPTION CHANGES - Some MEAT and LIVESTOCK PRODUCTS

	Pounds Per Capita 1911-1915	Pounds Per Capita 1935-1939	Per Cent Increase	Per Cent Decrease
Beef	63.5	54.8		14
Veal	6.4	7.8	22	
Pork, Excluding Lard	67.3	56.1		17
Lard	11.4	11.1		3
Lamb and Mutton	7.2	6.8		6
Manufactured Dairy Products(Milk Equivalent)	440.0	461.0*	5	

Some of the decline in the use of meat is due to diet changes but unquestionably much of it is forced by low incomes of consumers. Note that meat production is declining more rapidly than meat consumption.

Any of the following can cause this country to feel acutely the growing food scarcity:

1. More exports either as a result of the war or to feed hungry nations after the war.
2. Increased employment causing greater food consumption by labor.
3. Lower yields due to drought or other causes.

Unbalanced cropping systems and erosion are rapidly depleting the soil fertility of this country. Even in an old conservative well-farmed state like Ohio the annual reduction of soil fertility is estimated at two-thirds of one per cent per year. In some other states it is much more rapid. (See Digest Page 606)

Our population is still increasing. (See Digest Page 855)

Removal of crop acreage restrictions will bring temporary relief but in general the best land has not been retired from crop production in complying with the Government programs.

Perhaps there is no cause for immediate alarm over a food shortage but a warning needs to be sounded against complacently accepting surpluses as permanent when we are rapidly coasting downhill toward a subsistence level of food production.

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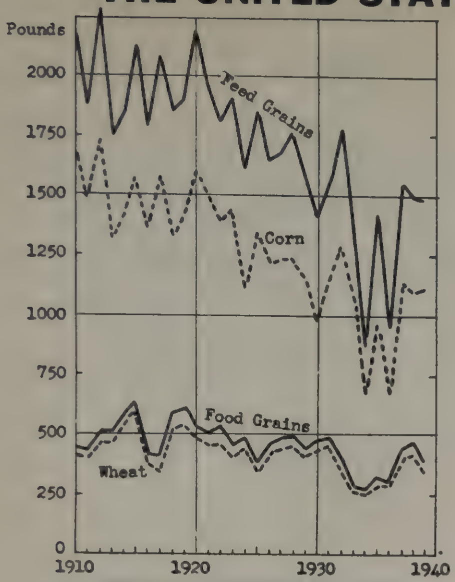
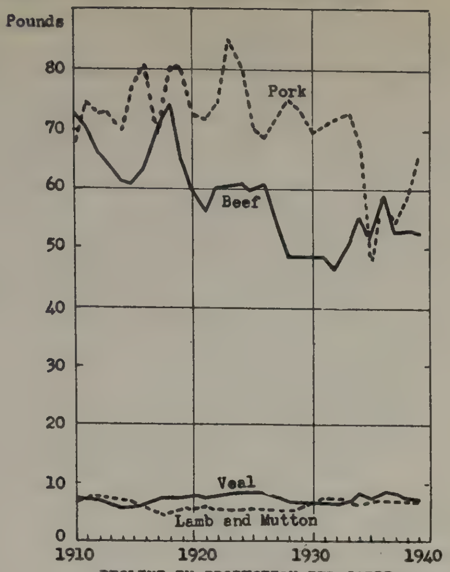
* 1935-37 Data; ** 1919-21 Data
Based on Data of U.S.D.A

THE UNITED STATES FACES FOOD SCARCITY?



DECLINE IN PRODUCTION PER CAPITA
Feed Grains and Corn; Food Grains and Wheat
30 Years, 1910-to 1939



DECLINE IN PRODUCTION PER CAPITA
Pork, Beef, Veal, and Lamb and Mutton
30 Years, 1910 to 1939

The downward trend in per-capita production is shown by the accompanying graphs. These picture the detailed trends shown in figures on the front of this page.

For feed grains and the principal feed grain, corn, the decline has been very rapid during the past twenty years. For food grains and the principal food grain, wheat, there is likewise a distinct downward drift.

The downward trend for livestock in the second graph is also surprisingly consistent.

"The failure of our food production to increase with population during the past two decades has resulted in a decrease in exports and an increase in imports. In view of these facts and the present world situation, the question naturally arises as to whether the United States could suddenly meet an increased demand for food from warring countries...This country is not in a position to export the quantities of food that were shipped to Europe during 1916-18.... During the last three good crop years, United States imports exceeded exports. For exports to equal imports, it would be necessary to increase production 3 per cent over 1937-39. To export the 1916-18 quantities would mean an increase in production of 7 per cent." (Pearson and Myers, Cornell U.)

Given increased purchasing power, people consume and waste increased quantities of food. Numerous studies of consumption per capita at different income levels reveal increased purchases of food with increased income.

14.2% of U.S. families have annual incomes under $ 500 and spend only $203 for food.
27.5% of U.S. families have annual incomes of $ 500 to $1000 and spend $347 for food.
23.0% of U.S. families have annual incomes of $1000 to $1500 and spend $456 for food.
4.0% of U.S. families have annual incomes of $3000 to $4000 and spend $771 for food.

About 96 per cent of the families have incomes below $4000 annually and all these rapidly step-up food consumption as their income increases.1/

Therefore, whenever increased buying power returns to workers now on relief and other low income families they will rapidly increase their consumption of food.

During the ten years, 1929-38, the non-agricultural income of the U. S. varied from a high of $72,000,000,000 to a low of $42,000,000,000; and retail food sales consistently amounted to 21.2 per cent to 22 per cent of the non-agricultural income.

A food shortage can be met by more closely approaching the living standards of the older countries. The differential now existing is shown by the crop acreage available for domestic consumption per person in this and ancient countries.2/

United States	-	2-1/3 acres in crops per person
China	-	1/2 acre in crops per person
Japan	-	1/4 acre in crops per person

Much of this disparity is made up by less use of animal products. There is a large loss in converting grain and other feed into meat or milk, therefore, substitution of plant foods for animal products would greatly reduce the acreage needed to feed the American people.

Americans prefer liberal portions of animal products in their diet and apparently will substitute rice and other grains only under severe economic pressure.

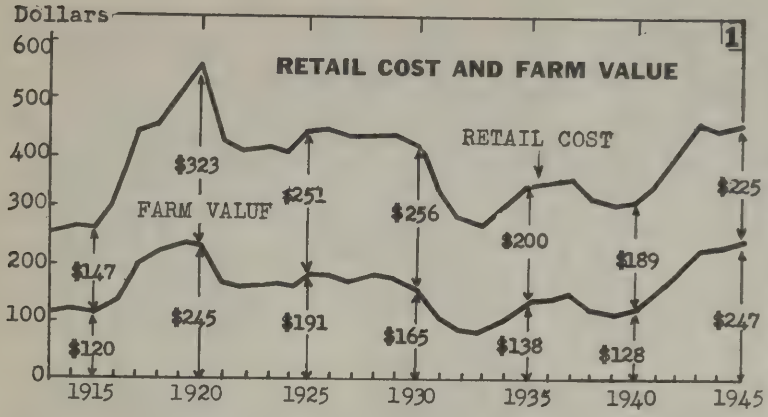
Apparently the ability of this country to provide the food needed and desired by the people of this nation in the future will depend upon developments such as the following:

1. The ability of farmers to continue to offset soil losses and fertility depletion with such improvements as higher yielding crop varieties, better cultural practices, and more efficient livestock.
2. Development of undrained land and land capable of irrigation and other land tillable when improved.
3. Permanent withdrawal of food crops from export trade.
4. Increase of food imports.
5. Willingness of the people to change their diet to cheap plant foods due to higher food prices - particularly of livestock products.

We question whether item two will long continue to offset losses sustained under item one. If this is true then food shortage, if and when it comes, must be met primarily by withdrawing food from world trade, increasing imports, and by forcing the people to eat more plant foods and less meat, milk, and other animal products.

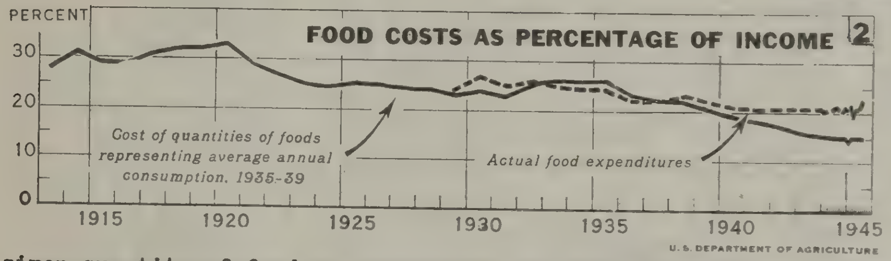
1/ Figures from Economic Information, Wisconsin Agricultural College
2/ National Resources Board. Graphs Based on Data of U.S.D.A.

FARMER'S SHARE OF CONSUMER'S FOOD DOLLAR



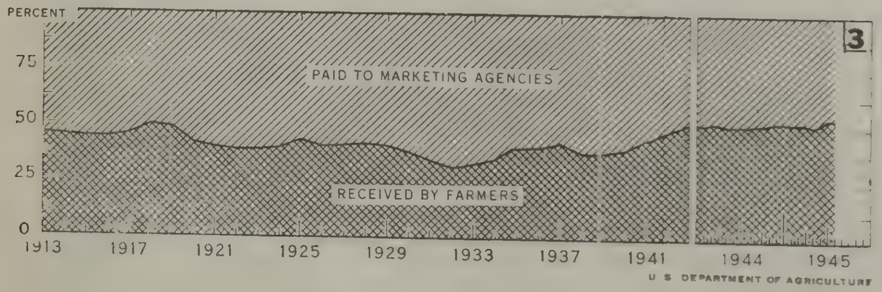
The farmer's share of the consumer's food dollar increased from 39 cents to 52 cents from 1939 to 1943. Since then there has been little change. In 1945 farmers received 54 cents out of every dollar spent for food. This is an all-time high, exceeding the 1944 peak by one cent and the 51 cent peak of World War I by 3 cents.

Marketing costs have not advanced as rapidly as retail prices and farm values of food products since 1939. Increasing labor costs, however, will soon force a reversal of this trend. This means that every decrease in the retail price of food products will be reflected almost dollar for dollar in lower farm prices.



Consumer incomes have risen faster than retail food prices since 1938. This is shown by the decreasing percentage of the total income required to purchase a given quantity of food as compared to the 1935-39 average. Actual food expenditures have increased more rapidly than retail food prices, reflecting the costs of a larger quantity of food consumed and a shift to expensive foods such as fresh fruits, fresh vegetables, and meats. Civilian food consumption during the war was well above the 1935-39 average. The U.S. Department of Agriculture reports that per capita food consumption was 11% higher in 1944, and 9% higher in 1945 than in the 1935-39 period.

FARM VALUE AS PERCENTAGE OF RETAIL VALUE



YEAR	%	YEAR	%
1913	47	1930	39
1914	46	1931	36
1915	45	1932	32
1916	45	1933	33
1917	48	1934	34
1918	51	1935	40
1919	49	1936	41
1920	43	1937	43
1921	40	1938	39
1922	40	1939	39
1923	40	1940	40
1924	41	1941	44
1925	43	1942	48
1926	42	1943	52
1927	41	1944	53
1928	43	1945	54*
1929	42		

*8 month avg.

THE MARKET BASKET

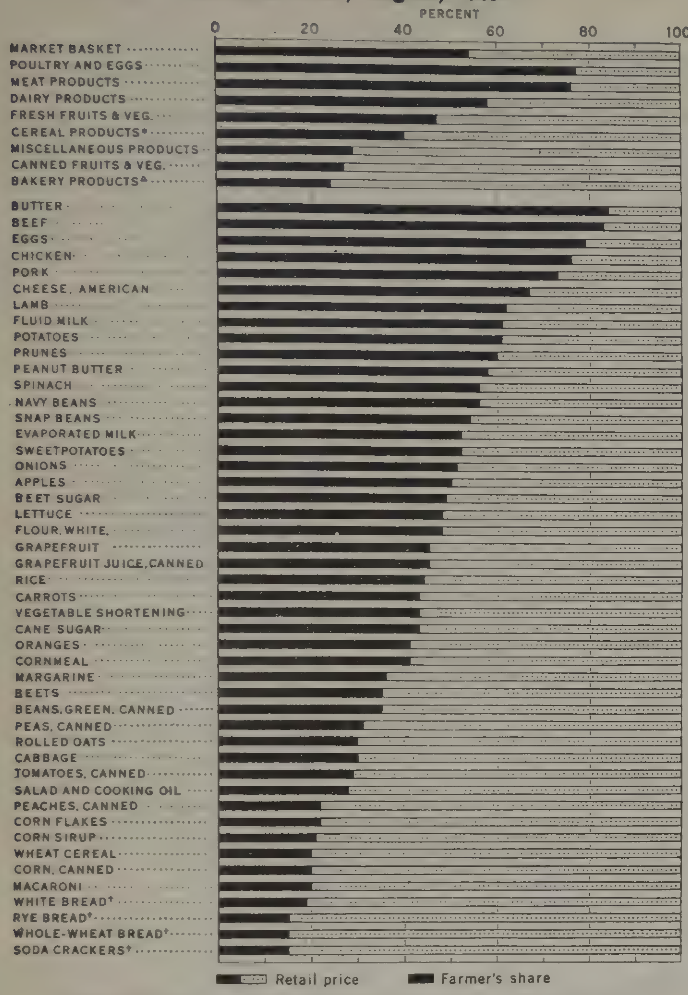
"The Market Basket" of farm food products which is used as the basis of Graphs 1 and 3 on this page, is the term applied by the U.S. Department of Agriculture to a measure of the average amounts of food purchased by an average family in a year. This measure considers farm products which actually pass through food marketing channels, and does not consider products consumed by producers, or foods of non-farm origin. The per capita amount of each product marketed and consumed domestically as food is then determined, and this amount is multiplied by three to obtain the amount consumed by an average family.

In 1919 marketing charges for foods in the market basket stood at $263 and advanced to $323 in 1920--an all-time high. Charges in the first 8 months of 1945 were only $225. Economies in distribution, introduced since 1920, account for much of this difference.

Based on U.S.D.A. Data

FARMER'S SHARE OF CONSUMER'S FOOD DOLLAR

FARM FOOD PRODUCTS: FARMER'S SHARE OF RETAIL COST, August, 1945



*OTHER THAN BAKERY △INCLUDES INGREDIENTS OTHER THAN FLOUR †FLOUR INGREDIENT ONLY

U. S. DEPARTMENT OF AGRICULTURE BUREAU OF AGRICULTURAL ECONOMICS

There are a number of factors which affect the share of the consumer's food dollar received by the farmer for his products. Some of these products require little processing before being sold to the consumer--eggs for example. On the other hand, before wheat can be sold to the housewife as bread, it requires a great deal of processing and handling.

There are other food products which leave the producer in the form in which they will be sold to consumers, but they require special care and expensive handling. Oranges in the grocer's window look quite similar to those hanging on the tree, but oranges are a perishable fruit which requires careful handling. They must be kept in cold storage, and shipped in refrigerator cars. Compared to a product such as meat or butter, oranges are bulky and require more storage and shipping space.

The farmer's share of the consumer's food dollar spent for beef steak, butter, and other high-priced food was unusually high when the data for the accompanying graph were prepared. This is partially due to government subsidies paid to processors which tend to absorb part of the processing costs.

As government subsidies to processors are abandoned, the farmer's share of the consumer's food dollar will return to normal. Farmers should not expect to continue to receive 83 cents out of every dollar spent for beef steak, and 84 cents out of every dollar spent for butter. Producers' subsidies which are paid direct to farmers, have approximately the same net effect on farm income.

When subsidies are abandoned, regardless of how or to whom paid, farmers will absorb all or almost all of the loss as soon as demand is more nearly satisfied. Farmers can expect lower prices for farm products within 2 years. Prices may remain high temporarily while we attempt to "feed the world", but soon this project will have been completed or abandoned.

The farmer's only real hope for permanently retaining a larger share of the consumer's food dollar is through "Vertical Farm Diversification". This means performing more of the marketing services between the farm and the grocery store. Many farmers are already doing this indirectly through cooperatives, notably citrus fruit growers and dairymen. Although these farmers do not perform the services themselves, they own a share in the business that does, and save a certain percentage of the processing cost.

Each step in the processing of farm products for market necessarily includes a profit for the processor. The more of these steps that farmers can perform, or control, the larger their share of the consumer's food dollar. Thus farmers and farm communities can, by applying the principle of Vertical Farm Diversification, increase their earnings without increasing retail costs.

CONSUMPTION PER CAPITA — — 1935 – 1939 (AVERAGE)

MEAT (dressed weight)	lbs.
Beef and veal	63.2
Lamb and mutton	6.7
Pork (excluding lard)	56.5
Total meat	126.4
FISH	
Fresh and frozen (dressed weight)	6.4
Canned fish and shellfish	5.0
Cured fish	1.1
FATS AND OILS	
Butter, farm and factory	16.8
Lard	11.0
Compounds and vegetable cooking fats (fat content)	11.9
Margarine (fat content)	2.3
Other food products and uses (fat content)	6.3
Total fats and oils	48.3

POULTRY PRODUCTS	lbs
Eggs	37.5
Chickens (dressed weight)	18.0
Turkeys (dressed weight)	2.7
DAIRY PRODUCTS	
Total Milk	806.5
Cheese	5.6
Condensed and evaporated milk	16.8
Ice cream	9.6
Fluid milk and cream	342.3
VEGETABLES	
Fresh	237.0
Canned	31.4
Potatoes	130.0
Sweetpotatoes	23.4
Beans, dry edible	9.0
Sugar (refined)	97.0

FRUITS (fresh)	lbs.
Citrus	49.1
Apples	43.1
Other fruit	59.9
Canned fruits	15.0
Canned juices	5.4
Frozen	.7
Dried	5.7
GRAINS	
Wheat	222.4
Rye	3.9
Rice (milled)	6.2
Corn	57.6
Oats	6.9
Barley	21.6
BEVERAGES	
Coffee	14.0
Tea	.7
Cocoa	4.4

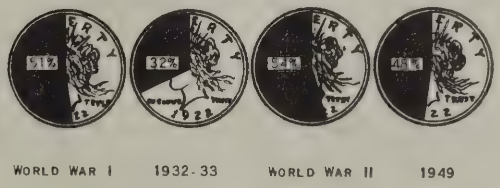
FARMER'S SHARE OF CONSUMER'S FOOD DOLLAR -- LESS THAN HALF

Consumers are complaining. Food prices are staying up, and they know that farm prices have dropped. They want to know why the retail price doesn't come down more than it has.

Farmers have shouldered nearly all the price decline so far, while wages to store help and other middleman agencies have continued to go up. Farmers get only 48 cents of the consumer's food dollar now as compared to a high of 55 cents 18 months ago -- a drop of 13 per cent.

During the early post-war years, the European relief program helped to keep the farmer's share high. Before the war the farm share of the food dollar was around 40 cents. At the depression low farmers received only 32 per cent. The chart below shows the relative share that the farmer received from the food dollar in four different periods.

FARMER'S SHARE OF CONSUMER'S FOOD DOLLAR, U.S.



We have been asked why prices received by farmers for major foods have dropped nearly 20 per cent in the last 18 months, and retail prices for the same products, as a national average, fell only 8 per cent -- why the farmer gets 8 cents a pound less for beef than he received in January 1948 and the city consumer pays, on the average, only a cent less per pound than he did at the start of 1948. The answer to this lies in distribution costs. The raw material cost has little bearing on the cost of some food items at retail. The costs in between have risen all along the line. It is a fact that -- farmers could give away what they produce and the price to people who buy would be nearly as high as before the war.

Farm prices in the market place are very unstable when compared with wages and nonfarm prices. This is reflected in the farmer's share of the consumer's dollar, as it goes up and down with farm prices. This is due, in part, to the large proportion of inflexible items, such as labor, in the distribution costs.

From the table it is easy to see what the consumer pays for major foods, how much of this the farmer gets and what his percentage is.

RETAIL vs. FARM PRICES
(Nation-wide Averages)

	Consumer Pays	Farmer Receives	Farmer's Share
	(dollars)		(per cent)
Beef, pound	$0.68	$0.44	65%
Lamb, pound	.74	.42	57
Pork, pound	.41	.27	66
Butter, pound	.69	.49	71
Cheese, pound	.47	.28	60
Milk, quart	.19	.12	63
Eggs, dozen	.64	.47	73
Chicken, pound	.52	.28	54
Bread, pound	.14	.02	14
Corn Flakes 8oz. Package	.12	.02	17
Flour, White, pound	.08	.04	50
Apples, pound	.12	.05	42
Carrots, bunch	.10	.04	40
Onions, pound	.08	.02	25
Potatoes, pound	.05	.02	40

The farmer's share ranges from a low of 14 cents of the food dollar for bread to a high of 73 cents of the food dollar spent for eggs. This further emphasizes the inflexibility of other costs in processing. It takes only 2 cents worth of wheat to make a 14 cent loaf of bread. The additional 12 cents goes for other raw materials, middlemen and the baking.

The price of the wheat in a loaf of bread has fallen about 1-1/2 cents in the last 18 months. Bread prices, however, are unchanged. Retail bakers got most of the benefit, since flour prices declined along with wheat prices. In any future drop of bread prices, bakers are likely to take the cut in margins. Wheat is near U.S. support level now, and can't fall much.

Farmers, on the other hand, receive most of the money from a dozen eggs. There is little or no processing to be done. Many farmers sell eggs direct to the consumer. Others sell their eggs to commission men who in turn sell to the retailer, and then on to the consumer. This adds two more steps to the marketing process, but not much labor is involved.

With meats, too, there are few intermediate steps between producer and consumer. The farmer's share of the meat dollar is around 65 cents.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 8, Mo.

FARMER'S SHARE OF CONSUMER'S FOOD DOLLAR -- LESS THAN HALF

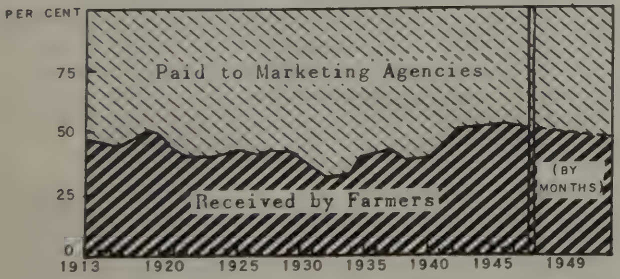
On a national average, beef retails for 68 cents a pound -- of this, purchasing and marketing agencies get 24 cents and farmers 44 cents. Marketing costs now average 11 cents per pound higher than the prewar margin, but if housewives are to get cheaper meat, farmers most likely will have to absorb another price cut. Railroads and trucks must charge more to bring livestock to market. Stockyards get larger handling fees. Brokers receive higher commissions. Processing, from packing plants through to retail butchers, costs more. These costs are largely controlled by union labor and will all be slow to come down.

Milk costs consumers about 19 cents a quart, on the average. Dairies get 7 cents of this, 2 cents more than prewar. The farmer keeps 12 cents -- twice as much as pre-war. Farmers are aided by Government-enforced marketing agreements in checking further raw-milk price declines. But, farmers will take additional price cuts if demand slows.

Fruit and vegetable price declines are being almost entirely absorbed by the growers. This is due to the fact that marketing costs in these products have skyrocketed, and are not easily reduced. Public demand for these products depends on better, more costly handling and packaging. Also, perishable fruits, such as oranges and lemons, require careful handling. They must be kept in cold storage and shipped in refrigerator cars. Compared to other refrigerator products such as meat or butter, these fruits are bulky and require more storage and shipping space.

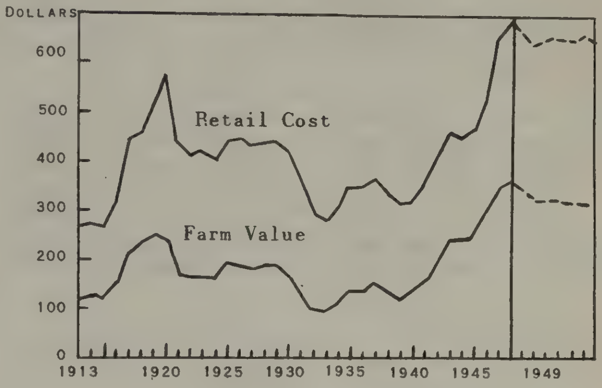
The following graph helps to emphasize the relative position of the farmer and of the various marketing agencies in the division of the consumer's food dollar. Only during the two war periods did the farmer's share for all food products go above 50 cents. Inversely, in only those two periods did the processors receive less than half.

FARMERS SHARE OF THE CONSUMERS FOOD DOLLAR, 1913-1949



But farm value of the market basket is slipping downward faster than retail cost. In 1940 the margin between the two was 187 dollars; in 1948, it was 328 dollars. Now with both farm value and retail cost going downward, the margin between the two has increased to 332 dollars, and will spread even farther apart in the next year.

RETAIL FOOD COST AND FARM VALUE
U.S. 1913-1949



VERTICAL FARM DIVERSIFICATION

As farmers see their share of the consumer's dollar gradually shrinking, they realize that something must be done. Agriculture cannot prosper when it receives less than the cost of production. Part of the answer appears to be more Vertical Farm Diversification.

This means doing more of the middleman jobs on the farm or in cooperation with neighbors. The citrus fruit growers and dairymen in some milk-sheds have made real progress but too often the emphasis has been on "restricting" the flow of food to the consumer. Farming is a volume business and all limitations on production, whether government or voluntary, cut down farm volume. What is needed is to find ways of selling a greater volume of products at a reasonable profit and not just a trickle at high prices.

Historically, those closest to raw production are the lowest paid within any economy. This applies especially to farmers -- whose troubles arise not so much from exclusive production of any one crop, but from exclusive raw production.

Each step in the processing of farm products for market necessarily includes a profit for the processor. The more of these steps that farmers can perform, or control, the larger their share of the consumer's food dollar. Thus farmers and farm communities can, by applying the principle of Vertical Farm Diversification, increase their earnings without increasing retail costs.

RULES OF THUMB

HANDY INFORMATION FOR FARMERS AND BUSINESSMEN

Hogs -- It takes 5½ pigs per year to support a sow for a year. There should be at least 12 hogs to sell per sow annually. Eight pigs weaned per litter are twice as profitable as six pigs per litter. The average farmer farrows 10 pigs; weans 6½ pigs; and sells 5.6 pigs per litter.

The cost of growing hogs includes the cost of feeding the breeding herd.

STANDARD FEED REQUIREMENTS	CORN	PROTEIN
PER 100 LBS. PORK SOLD (INC. BREED. HERD)	7½ BU.	40 LBS.
PER HOG MARKETED AT 225 LBS. (INC. BREED. HERD)	17 BU.	90 LBS.
FROM BIRTH TO WEANING AT 35 LBS.	40 LBS.	6 LBS.
FROM WEANING TO MARKET AT 225 LBS.	12.0 BU.	70 LBS.

Most hog producers figure that it is not profitable to feed when 100 pounds of pork on the hoof will not buy 10 bushels of corn. Actually farmers begin cutting down when 100 pounds of hog fails to buy 12 bushels of corn. Efficient operators, however, can still show a profit when 100 pounds of pork buys only 7 bushels of corn.

Cattle (beef) -- Experienced feeders say that you should take about three weeks to get a bunch of cattle up to full feed. To crowd cattle faster than they can handle it, may result in founder, scours and slow gains.

- There should be at least an 80 per cent calf crop. The average weight of the calves at weaning time should be 400 pounds or more. The cost of harvested feed fed should not be over $30 when calves sell at 15 cents or $40 when they sell at 20 cents.

In the feedlot it takes 12.5 bushels of corn to produce 100 pounds of beef.

Cattle (dairy) -- The cost of raising a calf from birth to first freshening at about 25 months of age varies from $80 to $135.

Breed heifers by weight -- not age.

BREED	*WEIGHT*
Holstein	*750 Lbs.*
Guernsey	*550 Lbs.*
Jersey	*500 Lbs.*
Ayrshire	*650 Lbs.*
Brown Swiss	*750 Lbs.*

- With efficient organization three men can handle a 60-cow dairy and grow the accompanying crop. To be profitable, dairy cows must produce at least 6,000 pounds of milk or 250 pounds of butterfat per cow. The man labor per 100 pounds of milk should not exceed 1.5 hours.

- The average dairy cow is worth about 40 times the price of 100 pounds of milk. It takes 7 pounds of feed (13-14 per cent protein) per pound of butterfat produced.

Sheep -- Plain baking soda is better than sulphur for treating lambs that over-eat when on full feed. It does not affect gains or grain consumption like sulphur. About 1¼ pounds of soda a day mixed with the feed for 100 lambs is the amount to use.

- There should be one lamb to sell for every ewe. They should be ready by July 15 at 70 lbs. from farm flocks. Ewes must shear 8 lbs. of wool to be satisfactory.

Poultry -- Good hens eat 90 pounds of feed and produce 200 eggs. Poor hens eat 80 pounds of feed and lay only 100 eggs. If you gather only 40 eggs per day from 100 hens, a 100 pound bag of feed makes only 13 to 15 dozen eggs -- if you get 60 eggs the same bag of feed makes 18 to 20 dozen eggs.

Whenever it takes more than 7 dozen eggs to buy 100 pounds of feed (and that condition lasts for long) farmers begin to cut down their laying flocks.

- For broilers up to weights of 3 or 4 pounds live weight, it takes 4.25 pounds of feed per pound of gain. For roasters carried to 6 pounds it takes 6 pounds of feed per pound of live weight.

- Turkeys require 4.4 pounds of feed per pound of gain, in a 24-week growing season.

Corn -- It takes about 150 pounds of nitrogen, 25 pounds of phospherous and 75 pounds of potassium to produce 100 bushels of corn.

- Corn matures 51 days after it silks (2 days variation each way). It will still be high in moisture at this time, but needs only to dry out. A hard freeze will still damage, but not frost.

Corn should be produced with not over ten hours of man labor per acre. Modern methods use as little as four hours. The yield should at least be 40 bushels per acre.

Soybeans -- A bushel of soybeans yields about nine pounds of oil and 48 pounds of meal. One cent per pound change in the price of soybean oil affects the price of soybeans nine cents per bushel. A change of $5 per ton in the price of soybean meal means 12½ cents per bushel change in the price of beans.

Soybeans should be produced with four to eight man hours per acre and yield 15 bushels or more per acre.

Flax -- Flax straw has a feeding value of $12.46 per ton when corn is worth 75 cents.

Cotton -- The cottonbelt loses approximately $230,000,000 to cotton insects each year. Bollweevils, aphids, bollworms, fleahoppers, plant bugs and leaf worm destroy one bale of cotton for every seven the farmer gets.

This material is based on factual information believed to be accurate but is not guaranteed.
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RULES OF THUMB

Cottonseed that is two years old, if properly stored, is normally as good or better than new seed.

Alfalfa -- One shower on cut alfalfa may reduce the protein content 36 per cent.

Wheat should be grown with six man hours per acre and yield 15 bushels or more. Modern methods require about three hours per acre.

Hay should be made with 2.5 to 4 man hours per ton and yield 1½ tons per acre or more.

Buildings -- The approximate percentage of annual gross income that can be used to pay for the buildings needed by livestock varies with the kind of livestock -- dairy cow, 10 per cent; beef cow, 8 per cent; sow, 6 per cent; ewe, 7 per cent; and hen, 9 per cent. This means that if the produce from a dairy cow is worth $250.00, then that cow can pay $25.00 a year rent for the buildings she uses. This figure divided by 8 and multiplied by 100 equals the amount that can be safely spent for a building -- in this case $312.50 per cow or $6,250 for a 20-cow herd.

Machinery -- At the present time a well managed two-man farm in the Cornbelt has about 75 mechanical horsepower units per man. This includes a small truck, two tractors and 10 or 15 horsepower of supplementary power and does not include the family automobiles.

Labor -- In 1920, 32 minutes of man labor were required to produce a bushel of corn; in comparison it now requires 6. Man labor per bushel of soybeans has been reduced from 50 to 10 minutes and the total cost of producing other grain crops has been reduced by 30 per cent or more.

Housework-- Farm women spend 64 hours per week in the kitchen.

Skim Milk-- One hundred pounds of skim milk fed to pigs will replace one-fifth bushel of corn and seven pounds of tankage. Stated in another way, one hundred pounds of skim milk is worth one-half bushel of corn. Skim milk can be fed efficiently to pigs at the rate of about one pound of skim milk for each pound of concentrate fed. If fed in greater quantity the feed value of the extra milk goes down fast.

Whey is worth about one-half as much per 100 pounds as skim milk and only 1/60 as much as tankage. Whey should always be pasturized at the plant to prevent the spread of disease. Sour whey is as valuable as sweet whey.

Pasture -- Grass crops hold soil 300 times more securely than corn. When a crop is grazed, three-fourths of the minerals are returned direct to the soil. Bluegrass yields 60 per cent of value for meat or milk in the months of April, May and June.

During a six month pasture period, a cow removes from the soil approximately 115 lbs. of nitrogen, 26 lbs. of phospherous, 93 lbs. of potash and 37 lbs. of lime.

Yields in pounds of beef per acre with different pasture systems.

Bluegrass	*105 Lbs. of Beef*
Bluegrass and Lespedeza	*175 Lbs. of Beef*
bluegrass, Lesp. and Fert.	*195 Lbs. of Beef*

Erosion -- Causes 22 times as much loss of soil nutrients in Missouri as cropping. Every bushel of corn grown on sloping land is estimated to cost 1 ton of soil. The total national loss from erosion has been set as high as $750,000,000 per year.

Missouri studies show that corn yields go up as soil depth increases. This is true whether the average yields in a particular year are high or low.

Depth of Surface	*Corn Yield*	*Depth of Surface*	*Corn Yield*
0	*16 bu.*	*8*	*54 bu.*
2	*25 bu.*	*10*	*60 bu.*
4	*38 bu.*	*12*	*64 bu.*
6	*46 bu.*		

Livestock Bruises -- Annual loss through bruised meat has been calculated at 50 million dollars. At one market it was found that 39 per cent of the hogs were bruised. Causes of 40.4 per cent of the bruises were by cane, whip or club; 18.7 per cent by kicking or prodding; 18.4 per cent by crowding and tramping; and 10.1 per cent by fork, nail or puncture. Nearly half (48.6 per cent) of the bruises occurred on the farm. Average loss was 19 cents per head for all hogs sold or 48 cents per bruised hog. There was little difference between rail and trucked-in receipts.

Fence Posts -- Dig the hole 10 times as deep in inches as the diameter of the post. A 6" corner post with two supporting 5" posts will build a strong fence corner. Extra large posts do not increase the strength of fence corners much. But, doubling the depth of a post hole makes the corner post 4 times stronger.

Investments -- A man should be able to pay down at least 50 per cent of his total investment (land, buildings, machinery, livestock and working capital) if he is to pay out on the basis of farm income and profits alone. It is almost impossible to make profits on downswings in prices.

Ranch investments under normal conditions should not exceed $150 per cow for land, buildings and equipment. Costs in most areas are much higher today.

Dairy farm investments under normal conditions should not exceed $400 per cow.

Editor's Note -- This page has been prepared after repeated requests. Please send us your suggestions and some of the "Rules of Thumb" that you find handy on your farm.

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NORTHERN CORN BELT -- 4400 N. Port Washington Road, Milwaukee 12, Wisconsin
WESTERN GULF -- 3500 Cleburne Road, Fort Worth 1, Texas
NORTHERN GREAT PLAINS -- Rudge & Guenzell Building, Lincoln 1, Nebraska
SOUTHWESTERN -- Broadway Building, East Central Avenue, Albuquerque, New Mexico
PACIFIC COAST -- Swan Island, Portland 7, Oregon

FARM LANGUAGE

We have had requests for simple explanations of terms farmers use frequently. Here are a few. There is great variation from one area to another. What would you suggest including? What terms bother your friends, secretaries and customers?

Bale - A compressed block of material such as hay, straw or cotton, secured with wire or heavy twine.

Bangs Disease (Brucellosis of Cattle) - A contagious disease which causes cattle to give premature birth to their young (usually born dead). Contagious abortion. Incurable.

Barrow - A male hog castrated when a pig.

Binder - Machine for reaping and tying grain and stalks into bundles or sheaves.

Blackhead - Fatal infectious disease of turkeys.

Blackleg - Contagious and quickly fatal disease of cattle and (occasionally) sheep. Incurable, once acquired, but easily and cheaply prevented by vaccination.

Bloat - Sudden and often fatal gaseous distension of abdomen in animals.

Blocky - Applied to meat animals and some horses, meaning deep, wide, low-set and compact.

Boar - Breeding male of the swine species.

Breachy - Apt to break through or jump over fences.

Broiler - Young chicken usually under 2½ lbs.

Brooder House - House where chicks are hovered artificially.

Brood Mare - A mare kept to raise colts.

Buck - Mature male (usually sheep or goat).

Bull - Breeding bovine male - cattle species.

Bull-Rake or Buck-Rake - A scoop-shaped machine with long teeth that picks up hay in quantity out of the windrow or swath for transporting.

Calf - Young of cattle - usually under 1 yr.

Canner -Old cow fit only for sausage and processed meat.

Castrate - Operation to remove generative glands or testes.

Cholera - Common hog disease. Usually fatal.

Clover (red, sweet, alsike, white) - Legume hay and pasture crop - nitrogen soil builders.

Cockerel - Immature male domestic chicken.

Colt - Young horse or mule under working age.

Combine - A machine which cuts and threshes small grain in one continuous operation.

Concentrate - Feed low in fibre and high in digestible nutrients.

Contour - Line of equal elevation at right angles to slope of land.

Cord - A measure of fuel wood - 4x4x8.

Cover Crops - Crops to protect soil from erosion.

Cow - Mature female of cattle species.

Crossbred - The result of mating two purebreds of same species but different breeds.

Cull - Poor product or low producing animals.

Cultivator - An implement to loosen soil, form a mulch and destroy weeds.

Dam (livestock) - Female parent.

Dehorn - To saw or cut horns off cattle.

Dip - Substance to kill parasites on livestock, -- animals usually plunged into vats.

Disks (plow - cultivator - harrow) - Small, round sharp-edged, concave used to pulverize soil and kill weeds.

Dock - To cut off the tail. Also a price penalty at the market.

Draft Horse - Large, heavy work horse.

Drill (Grain) - Machine used to plant seed in regular rows.

Dry Cow - A cow not producing milk.

Ewe - A mature female sheep.

Fallow - Soil moisture storing by eliminating plant growth.

Farrow - Act of sow in giving birth to pigs.

Feeders - Cattle, hogs or sheep to be fattened for market.

Filly - A female foal or colt. A young mare.

Foal - The young of the horse family. Also act of mare in giving birth to a colt.

Fodder - Coarse stock feed, such as corn stalks.

Fresh Cow - Cow recently come into milk.

Fryer - Young chicken weighing over 2½ lbs.

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FARM LANGUAGE

Gang Plow - Two or more plows attached in tandem.

Gelding - A castrated male horse.

Gilt - Immature female pig between weaning time and the first litter.

Grade - Non-purebred animal.

Guinea - Domestic fowl of the pheasant family.

Hand - 4 inch measure - a hands breadth.

Heifer - Young female, cattle, that has not had a calf, variable age up to 5 years.

Hen - Mature female chicken,guinea or turkey.

Humus - Partially decayed vegetable matter.

Hybrid - Offspring obtained by mating two animals or plants of different species or breeds.

Jack - Mature male ass or donkey.

Jennet (Jenny) - Mature female ass or donkey.

Kid - A young, immature goat of either sex.

Kudzu - Vigorous growing legume of South.

Lactation - Period female animal gives milk.

Lamb - A young sheep under one year of age.

Legume - Plant family which with aid of certain bacteria removes nitrogen from air and deposits it in root nodules.

Lespedeza - An annual, but self-seeding, summer legume crop used as hay or summer pasture.

Litter - Multiple young, born at same time. Also material used for livestock bedding.

Mare - Female horse of breeding age.

Mark - Identifying nicks, brands or clips on animal. Sometimes used to mean castrate.

Molting - To cast off and renew feathers, skin, hair, horns.

Mower - Machine used to cut hay or grass.

Mule - Hybrid animal; cross of mare and jack.

Pedigree - Written record of an individual animal's parentage and ancestry.

Pig - Preweaned hog; also used as general term for swine of any age.

Plain - Generally inferior - lacking quality.

Polled or "Muley" - Naturally hornless.

Poult - A young, immature turkey.

Poultry -Any domesticated fowl used for or producing food.

Pullet - Young female chicken - under 1 year.

Pure-Bred - An animal with pure breeding, eligible for registration in a breed association.

Ram - Male sheep of breeding age.

Rouge - An animal given to wandering, and usually destructive.

Roughage - Coarse feed such as hay, silage, fodder.

Rugged - Big, strong.

Scrub - Animal inferior in breeding or development.

Separator - A machine used to separate cream from milk or grain from straw and chaff.

Service - The act of or ability to breed.

Share Crop - To pay rent with stipulated share of crops raised.

Shoat (or Shote) -A young hog of either sex, usually means larger than "pig".

Silage - Succulent fodder preserved through partial fermentation.

Silo - Any structure where silage is stored.

Sire - The male parent.

Sow - Female swine -- usually has had young.

Springer - A cow or heifer showing pregnancy.

Stag - A male castrated after reaching breeding age.

Stallion - A male horse of breeding age.

Stanchion - A device which secures animals by two uprights behind head.

Steer - A young castrated male, cattle.

Stripper - Cow that has almost ceased giving milk.

Stud - A collection of horses or dogs kept for breeding or the place where they are kept.

Suckling - An unweaned animal.

Veterinarian - Livestock doctor.

Wether - A castrated male sheep or goat.

Wire Terms -
Barbed wire: Two twisted strands with barbs. "Cattle" wire has 2 points on barbs - "Hog" 4 points.
Woven or net wire: A net-work of wires, welded or twisted to make a screen-like barrier.
Poultry wire: Light weight, woven wire.

1150 Laws, Legal Concepts

1150 Laws, Legal Concepts

BUSINESS LAW

A BRIEF STATEMENT OF PRINCIPLES THAT WILL HELP LANDOWNERS AND MANAGERS AVOID LEGAL DIFFICULTIES AND LOSSES

GENERAL

1. When in doubt on a legal question, consult a capable practical lawyer. Ignorance of the law excuses no one.

2. An agent or employee frequently avoids responsibility for difficulties and losses if he can show that he acted under the advice of an attorney.

3. Do not rush into transactions unless sure of your position. Most matters can wait until you can obtain all the information and advice needed to make your position clear.

4. If trouble or accidents occur, handle promptly. Get all the facts; determine who are the witnesses; take steps to stop further loss; and in case of injury see that complete medical care is given.

5. Work let on a contract basis tends to relieve the employer of liability. Damages for personal injury and other responsibilities usually fall on independent contractors.

6. In using legal forms such as leases and contracts be sure they apply to the state in which used and to the exact conditions of the case in hand.

7. Instruments and signatures written in pencil are binding but ink is preferable.

8. The alteration of a written instrument such as a contract or note, after being signed, will render it void. If changes are necessary after signing all parties should place their initials or signature opposite the changes or again sign under some such statement as, "Alterations as made are acceptable".

9. Blanks in a written instrument left for completion may legally be filled in after the parties have signed. Additional statements, however, cannot be written into blank space which was not left open for additions.

10. A receipt is not conclusive against a claim. A claimant can recover, even though a receipt was given, if he can prove that the debt has not been paid.

11. A release given for a consideration, in discharge of all demands, cannot be set aside except by showing fraud.

12. A debt or other obligation after being outlawed is renewed and the time limit extended by making part payment or by payment of the interest thereon.

13. Lost property belongs to the finder unless claimed by the owner. Money found in places frequented by the public such as stores, cannot be demanded by the proprietor because found on his premises. The finder, however, must make an effort to restore it to the owner.

14. Be extremely slow in prosecuting a criminal charge. Usually these can be safely handled only through prosecuting or district attorneys as county and state cases. Large damage cases have resulted from criminal prosecutions that failed of conviction. In some cases such is held as prima facie evidence of malicious prosecution.

15. An accident can never be a crime unless criminal carelessness is fully proved.

16. It is fraud to conceal a fraud. Property obtained by fraud can be recovered unless held by an innocent third party. Stolen goods may be recovered whenever found.

17. Navigable streams the same as public highways are public property.

BUILDING CONSTRUCTION AND REPAIRS

1. Employment of independent contractors reduces liability. After making the contract do not direct his laborers or otherwise assume responsibility that has been placed on the contractor. Keep his position clear as an independent contractor.

2. Do not pay contractors until they give satisfactory evidence that sub-contractors, mechanics, or other workmen and materialmen have been paid in full.

3. Whenever major construction is undertaken require liability insurance. Have the property owner and agent's names included in the policy. This applies particularly to any type of hazardous undertaking such as dynamiting.

4. Have major building contracts drawn or approved by an attorney.

5. Owners of adjoining improved real estate must share the expense of making and keeping fences in repair. (See State Laws)

CONTRACTS

1. Contracts should be put in writing. They should be carefully worded so as to completely and clearly show the agreement that has been reached.

2. Contracts are expressed contracts when the agreement is formally stated either verbally or in writing. They are implied where an agreement in fact is presumed from the acts of the parties.

3. Contracts that must be written are:

(a) Real Estate sales contracts

(b) Those given in consideration of marriage

(c) Guarantees

(d) Contracts that cannot be performed within a year

(e) Contracts for sale of goods if the value exceeds certain minimums, depending upon the state law

4. Verbal statements and representations which are not included in a written contract are not enforceable as part of the contract.

5. To be enforceable contracts must:

(a) Be between legally competent parties,

(b) Express an agreement,

(c) Show sufficient consideration,

(d) Be legal as to object and subject matter.

6. A contract cannot be enforced if consent is given by mistake, or as a result of threats, or is obtained by misrepresentation or fraud.

7. A contract made with a minor cannot be enforced, except to the extent of supplying actual necessities. A contract made with a person of unsound mind is voidable.

8. A contract normally is construed by the laws of the state where completed, i.e., where the last party signs.

9. Full performance of a contract is necessary before payment or any part thereof can be collected, unless otherwise specified.

10. When sickness prevents the completion of a contract, recovery for the part performed can be had, provided it proves beneficial to the other party.

11. A contract made in violation of the law or for immoral purposes or to commit a breach of the peace is void. Wagers cannot be collected by law.

12. A contract is wholly illegal if any part is illegal.

13. Fraud vitiates a contract. It causes the responsibility of the innocent party to cease, but the contract still binds the guilty party.

AGENCY AND PARTNERSHIPS

1. An agent is a person authorized to transact business for another.

2. Agency is easy to create. It may result from contracts, express or implied, estoppel, operation of law and necessity, and ratification.

3. Death of a principal terminates an agency.

4. An agent must keep separate and distinct from his own, the property of his principal. If he does not and there is loss he is personally liable for such loss.

5. An agent is personally responsible for any damage that may result from disobeying the instructions of his principal.

6. Courts have held managers (agents) liable for personal injury and property damage suffered by tenants and strangers because of failure to keep premises in repair.

7. One partner can bind a partnership and each partner is responsible for all of the firm's debts.

8. Partnerships usually are created by participating in the profits of an enterprise, as profits, and makes the partners also liable for losses.

BUSINESS LAW

SALES

1. A bill of sale is a written instrument used to transfer the title to personal property. It is particularly important to require a bill of sale when possession is left even for a short time with the seller. Take delivery at once if the integrity of solvency of the purchaser is in question.

2. Sales of goods, wares, or merchandise ranging from $30.00 to $2500.00 (depending upon the state) are not enforceable unless:

(a) The buyer accepts part of the goods sold,
(b) Gives something in part payment, or
(c) Some note or memorandum is signed by the party to be charged.

3. The written memorandum may be informal, such as in notes or letters. It is important that the person to be held or charged should sign the memorandum.

4. Title passes on delivery, which may merely be a separation of the goods in a warehouse. Goods must usually be in condition ready for delivery. Delivery to a common carrier usually passes title. The intention of the parties governs.

5. The seller impliedly warrants the title to the goods sold. If he knows the use for which they are being purchased, he impliedly warrants that they are fit for the use. The same principle extends to the matter of latent defects of manufactured goods and the quality of foodstuffs.

6. A deed is a written instrument used to convey the title of real estate.

Warranty deeds covenant that the title is good and the grantor, or seller, agrees to keep the purchaser harmless against all claimants.

Quitclaim deeds warrant nothing and merely convey such right, title and interest, if any, which the grantor has.

7. No contract for the sale of real estate or any interest therein can be enforced unless in writing, signed by the parties to the contract or the lawful agents of the parties. If signed by agents, the agents must have authority in writing unless the agency is established by law.

8. The spouse should sign the sale contracts, as it will prevent them from changing their minds or causing trouble in closing.

9. The insurance should be kept in force by written notification to the insurance company agent (not merely the broker) that a contract for the sale of the property has been signed and the insurance is to remain in force during the completion of the sale.

10. Never make a sale without fully clearing the question of commissions. If there are any parties that may have even a remote claim for commissions require them to sign a waiver. Courts tend to favor agents in case of dispute.

11. An agent earns his commission when he produces a purchaser ready, willing, and able to purchase and who is accepted as such by the seller. Watch carefully commitments that may involve commissions.

12. Costs of closing a real estate sale normally are distributed as follows:

Seller - pays for abstract and perfecting of title to date of sale; also cost of making deed, including notary fee and revenue stamps.

Purchaser - pays for recording deed and his title examination. If a mortgage is involved he pays costs, including the abstract extension.

Escrow fees are paid by the one requesting the escrow services, unless upon agreement between the parties the fees are divided. The latter is usually the case.

NEGOTIABLE INSTRUMENTS

1. A note given by a minor, or signed on Sunday, usually is void.

2. An indorser of a negotiable instrument becomes liable to any subsequent holder if the maker fails to pay. Such liability is avoided by a qualified indorsement using such a statement as, "Without Recourse".

3. A check must be presented for payment within a reasonable time after its issue or the drawer will be discharged from liability thereon to the extent of the loss caused by the delay.

4. Unless a note is presented for payment upon the exact date of maturity at the place specified, the indorsers are released from liability. If no place of payment is specified a negotiable instrument is payable at the residence or place of business of the maker or wherever he may be found.

5. If the maker of a note or negotiable instrument refuses or does not make payment upon presentation, notice must be given the indorsers within a reasonable time, otherwise they are released from liability.

6. Extension of time of payment of a note or negotiable instrument by the holder without consent of the sureties and indorsers releases them from liability.

7. When a note is held as collateral security the temporary holder becomes the payee and must collect it when due or become liable to the owner.

8. Certification by the bank on which a check is drawn is equivalent to an acceptance. It has the effect of an assignment of funds of the maker of the check.

9. A note does not bear interest unless so stated but all notes bear interest after maturity, at the legal rate unless some other after-maturity rate is specified.

10. A note is governed by the state where it is made payable regardless of where drawn.

11. If a note is lost or stolen, the maker is not thereby released; the amount and consideration may be orally proved. A note is not the debt but is only one evidence of the debt. If the note, the best evidence of the debt, is lost, then it may be established by other competent evidence.

12. Forgery is a material alteration of a note or written instrument with intent to defraud. A forged instrument is not commercial paper. A party or bank paying money on a forged note or check, believing it to be genuine, must stand the loss. The one whose name is forged is not responsible.

MORTGAGES

1. Contrary to popular belief a chattel mortgage must be carefully drawn if it is effective.

2. The description of the property must be complete enough to fully establish the identity. Entry of the name of one or more parties who can identify the mortgaged property is a good precaution.

3. In taking a chattel mortgage on only part of a growing crop, take a pro-rata share of all of the crop rather than all the crop in a certain field. It is easier to check against the total crop than the part from a certain field and insures equal care of all the crop.

4. Have all parties who may claim ownership sign chattel mortgages and the notes, especially the wife.

5. In difficult cases a demand maturity will be a protection against neglect or abuse of the property held under chattel mortgage. This wording is effective; "On demand and if no demand be made, then on November 1, 1940".

6. In securing delinquent interest or principal of a real estate mortgage with a chattel mortgage do not take a new note. This will normally constitute payment adequate to release the obligation from the real estate mortgage.

7. Observe the state laws, particularly regarding filing, recording, etc.

8. It is a criminal offense to sell property covered by a chattel mortgage, unless upon the written consent of the mortgagee. It is well to see that the mortgagor knows this fact.

9. When taking possession of property in satisfaction of all or a part of a chattel mortgage be sure to take a bill of sale or assignment showing the terms under which the property is accepted.

10. When an agent sells a mortgage he guarantees the title.

11. Costs in connection with placing or renewing a mortgage such as abstracting, recording fees, perfection of title, notary fees, and often the cost of appraisal or inspection are customarily paid by the borrower.

LEASES

1. No person should be allowed to occupy real estate even for a very temporary period without a written lease.

2. Be sure to show a consideration in the lease and whether leased by the day, week, or month. These points are most apt to be overlooked in temporary and accommodation leases.

3. If a squatter moves onto a property either have him sign a lease or serve him with notice to vacate.

4. In the event of foreclosure or other acquisition of property from a former owner it is important to have the former owner sign a lease the day possession is due if he has not moved. It is usually less costly and complicated to dispossess a tenant holding a written lease than an occupant without a lease.

5. A lease on property where mortgage was given prior to the lease terminates with the foreclosure of the mortgage.

6. If possession is to be required of a tenant, notice should be given according to the state law even though not required under the terms of the lease.

7. Terminate leases by written notices that are preferably either acknowledged by signature of the tenant, or delivered in the presence of witnesses or by registered mail with return receipt

8. Both the husband and wife should sign leases. This facilitates collection in the event of family trouble or divorces.

9. Rents on premises let for illegal use cannot be collected by legal process.

10. "An agreement between two parties that one shall furnish a farm with a certain amount of teams and labor and the other shall manage the farm and give certain labor, the crops to be divided, does not constitute a partnership." (Blue v Leathers 15 Ill. 32)

HOW TO BUY A FARM

Most people buy only one farm during a lifetime. Therefore, take every precaution to avoid mistakes.

Finding the Farm

It takes hard and careful work to locate the farm you should buy. Those farms most advertised are usually the ones not to buy. Contact thoroughly reliable real estate agents. Have a clear understanding about the kind of property you want as it will save their time and yours.

Inquire among businessmen who deal regularly with the farmers of the area in which you are interested. It will be profitable to spend time living in the community where you hope to locate your investment. Develop andacquaintance with the most successful farmers.

When you become definitely interested in a farm, walk over every part of the property. Go alone so as to seek out what you should see rather than risk having someone show only what they want you to see. If it still impresses you as having an investment value in line with the price, you are ready to take steps toward the purchase.

Option

Have the real estate agent, if possible, secure a short-term option -- 30 days is usually sufficient. This is to protect you on the price and to give assurance that the owner will not refuse to sell to you after you have incurred the cost of an appraisal.

Both the husband and wife should sign the option. It is very convenient to report, "The old lady refuses to sign the deed", when the owner has changed his mind about selling or has been offered a higher price.

Appraisal

Next, have a complete, detailed, written appraisal made of the farm, preferably by an Accredited Rural Appraiser (A.R.A.). It should contain a detailed plat and soil ratings. If made by the American Rural Appraisal System, it will show the amount of value derived from each source and the earnings to be expected under typical management.

Be certain to secure the services of a disinterested appraiser. Your real estate agent has a commission involved, and it is unfair to expect him to make the appraisal.

Note: The following legal advice is based on Missouri conditions so some details do not apply in all states.

Legal Safeguards in Buying a Farm

ORRIN B. EVANS Attorney, Columbia, Missouri. Professor of Law, University of Missouri.

Circular 527 of the Agricultural
Extension Service of the University of Missouri College of Agriculture.

The conveyance of real estate is a technical matter for which lawyers are specially trained. A layman should not attempt to take title without the personal advice and assistance of legal counsel.

Four Steps in Purchasing Land

Most real estate transactions go through four phases, each of which is recognized in the law as distinct from the others. The first is the period of negotiation, the time of bargaining and "dickering;" the second is the period of contract, when the purchaser is bound to take and pay for the real estate and the vendor bound to convey it; the third is the period of conveyance, when title is actually passed to the purchaser; and the fourth is the period of recording, when the purchaser puts his newly acquired title on record to protect himself from subsequent transactions between the vendor and third persons. It is not essential that all these steps be taken separately; not infrequently a purchaser's first communication to the owner of land is an offer to pay so much money for a conveyance to himself, which offer is accepted by an immediate delivery of a deed. In such a case, the parties have fused negotiation, contract and conveyance into one transaction. However, that is not the ordinary situation and it is important to understand and distinguish the legal significance of the steps previously referred to.

A contract is usually defined as an agreement between the parties upon the essential elements of the transactions, in the form required by law. The dealings of the parties are analyzed in terms of "offer" and "acceptance." If A writes to B that he would like to purchase B's farm, Blackacre, for $5,000, A has made what is technically known as an offer. If B writes in reply, "I will sell you Blackacre for $5,000," he has accepted the offer and there is a contract between the parties. (This case illustrates that it is not essential to a good contract—though as a practical matter it may be desirable—that the agreement be embodied in a single formal paper.) However, if B's reply injects a new condition, he has not accepted the offer but has made a counter offer, and there is no contract until the counter-offer is accepted.

Unless an offer (or counter-offer) specially raises some additional term, the only essential elements of a binding contract for the purchaser of land are (a) a sufficient identification of the land and (b) the purchase price. If controversy arises, the court will then imply, as a matter of law, that in such a contract the vendor is obligated to tender a deed conveying a good marketable title within a reasonable time and the purchaser is obligated to pay the purchase price in cash at the time the deed is received. The court will also determine, on legal principles and without regard to the personal intention of either party, what improvements and equipment on the real estate were covered by the contract. If this is not the type of transaction desired by one party, it behooves him not to be caught in a completed contract before he has stipulated either by way of offer or counter-offer, all the terms of the agreement he wishes to make.

Under the law of Missouri, no contract for the transfer of an interest in real estate is enforceable unless it is in writing and signed by the party against whom enforcement is sought.

Negotiation Should Establish an Understanding

The lesson should be clear. During the period of negotiation, and before a binding contract is executed, the parties should reach a tentative agreement on all points which might affect the sale and these points should then be embodied in a written contract which leaves as few gaps as possible for the court to fill in the event of a dispute. Particularly the parties should reach an understanding on the following points and their agreement should be plainly written into the contract of sale.

1. **An Accurate Legal Description of the Land.** This will be necessary when the deed is executed anyway, and it may save a dispute as to whether the deed satisfies the obligation of the contract. In ordinary conversation we describe a farm as "the Jones place" or "the north 80," but in law the land is described by reference to sections platted on a map recorded in the office of recorder of deeds at the county seat. (For example, the Northwest Quarter of Section 12, Township 1, Range Six East, in Smithton County.) The quantity of land—i.e.—the number of acres—should also be stated.

In addition to a description of the boundaries of the farm, the parties should agree as to what goes with the farm as part of it. Such items as the radio aerial, pumps, the hay carrier fork and rope, light fixtures, window shades, etc., have been fought over many times. The only safe procedure is to walk over the premises with the vendor. Inspect all improvements, buildings, and equipment of every kind and reach an agreement, to be embodied in the written contract, on every item not so firmly attached to the soil that it couldn't be removed.

2. **The Price To Be Paid.**

3. **The Time and Place of Payment.** If the entire amount is not to be paid immediately, the interest, if any, to be paid on deferred installments. It might be pointed out that the contract should not require interest before the purchaser can obtain possession, nor interest on more than the unpaid balance. (That is, if the contract calls for five annual installments of $1,000 each, after two payments interest should be calculated only on the $3,000 unpaid balance, and after three years only on the $2,000 unpaid balance. Under many installment contracts, the purchaser is required to pay interest on the original indebtedness throughout the entire life of the contract, although he is constantly reducing that indebtedness by payments on the principal.) The purchaser should insist, if possible, on the right to pay off deferred installments before they become due.

4. **The Security for Deferred Payments.** There are two principal methods of securing future payments. One is by the contract itself. The purchaser agrees to pay the purchase price in the amounts and the times set forth, and the vendor agrees to give a deed only when the full price has been paid. The purchaser should examine and consider such a contract with great care, for it customarily provides that if he does not pay all the installments on the date called for, the vendor can terminate the agreement and retain the money previously paid. He does not have to use any legal proceedings, such as foreclosure, to cut off the purchaser's rights.

The other method of financing calls for the immediate transfer of the farm to the purchaser, who gives to the vendor a promissory note, or notes, and at the same time executes to the vendor a mortgage

(Continued from front)

LEGAL SAFEGUARDS IN BUYING A FARM

(in Missouri, this customarily takes the form of deed of trust) as security. If the note is not paid, the vendor can foreclose the mortgage. This method has certain advantages to the purchaser. The land can be taken from him only by foreclosure. It must be offered at public sale and if it is sold for more than the indebtedness, the balance goes to him. Furthermore, if he has better fortune in the next year, he may be able to redeem the land by paying to the man who bought it at the sale the amount for which it was sold.

A third method sometimes adopted is the escrow agreement. The deed is executed by the vendor at the time of making the contract and deposited with a disinterested third party—most often a bank or trust company—to whom the payments are made by the purchaser. On completion of the payments called for by the contract, the depositary delivers the deed to the purchaser and the money to the vendor.

Any of these methods of securing deferred payments should be adopted only after consultation with an attorney, and as the method should be clearly provided for in the contract, that means the contract should be scrutinized by the lawyer for the purchaser before it is executed. In fact, as stated below, if it is possible it is altogether desirable to have the contract written by an attorney. However it is sometimes necessary to make a binding agreement when no lawyer is available.

5. Transfer of Possession. This is related to the problem of deferred payments. In the absence of agreement, the vendor need not give possession of the land until it is paid for. The contract should provide for the date on which the purchaser may take possession.

6. Insurance. Usually, the execution of a contract of sale automatically terminates any insurance which the vendor may be carrying on the property. The contract should stipulate what insurance is to be carried, who is to take it out, who is to pay the premiums and how the proceeds of the policy are to be applied in case a loss is suffered. The purchaser should realize that after a contract has been executed, the risk of accidental destruction of improvements on the premises is upon him, even though he has not yet acquired title. That is, if he agrees to buy a farm for $10,000, he to take possession immediately and pay the purchase price one year later, and during that year the buildings which represent a substantial portion of the total value are burned, he will still have to go through with his contract and pay the full $10,000, unless the situation is provided for in the contract.

7. Taxes.

The only fair adjustment is for the taxes to be paid by the person who is entitled to the possession and enjoyment of the property. Thus, if land is sold on May 1st, the vendor should pay 4/12ths and the purchaser 8/12ths of the tax falling due and payable December 31st of that year. The vendor should pay all prior taxes and the purchaser all subsequent taxes. This must be written into the contract.

8. Assignment. In the absence of agreement, the purchaser can assign his purchase rights under the contract. Vendors frequently wish to restrict this right by contract provision, because they are unwilling to trust possession of the premises to unknown persons to whom the purchaser may assign.

9. Abstract of Title. The purchaser should insist that the vendor agree to deliver to him an abstract of title, showing a good title to the property, before any payments are due on the purchase price. The purchaser should take this to his attorney immediately for his opinion on the vendor's title. However, unless the contract specifically requires it, the vendor is not obligated to furnish an abstract.

Once an abstract is received, it should be carefully preserved. If the purchaser today should wish to re-sell his farm in the future, he probably will have to supply an abstract to his customer, and it is fairly expensive to have made up.

10. The Deed. Deeds are of two kinds—quitclaim and warranty. They are equally effective to convey whatever title the vendor has, but if it should subsequently appear that the title was defective, the purchaser who receives a warranty deed can sue his vendor for any resulting loss.

In discussing warranty and quitclaims deeds it is proper to point out (a) that the warranties of the vendor extend only to questions of title and do not guarantee against intrusion by trespassers; (b) that the warranty is of value only in so far as the vendor is financially responsible, and able to respond in damages if sued; and (c) that if the vendor has title—concerning which the purchaser presumably has assurance from the examination of the abstract—a quitclaim deed is equally effective. However, a warranty deed does add additional protection and, in addition, will have the effect of automatically passing to the purchaser a title interest which the vendor might acquire after he sold the land, though he did not have it at the time.

The contract should also stipulate the grantees in the deed, so that the contract may be owned in the same way that the land will be owned. There are many ways of holding title to real estate, such as jointly, in common, life estate with remainder over, etc., and your attorney can advise you as to the most desirable from your standpoint. A married man should seriously consider taking title in the name of himself and wife.

Preparing the Contract

When an agreement has been reached on these points, a written contract embodying it should be prepared in duplicate and both copies signed by both parties, each retaining a copy. While witnesses to the signing are not required by law, it is a proper safeguard to have a witness sign the contract as such. If the vendor is married, it is essential that his wife or her husband, as the case may be, sign the contract. The wife of the purchaser need sign only if it is desired to make her liable for performance of the contract. It is to the advantage of the parties to have the execution, as well as the drafting, of the contract supervised by an attorney.

If there is to be any appreciable delay between the date the contract is executed and the date when a deed is to be given, (and this is often the case when the purchase price is to be paid in installments), it is desirable for the purchaser to have the contract recorded by the recorder of deeds in the county where the land is located. Such recording protects the purchaser against loss of his rights through a subsequent sale of the land by the vendor to a third person. However, to be recorded any instrument (contract, deed, or other document) must first have been acknowledged before a notary public.

The Abstract of Title

One cannot sell what he does not own. Though you pay full value in the best of faith and your vendor gave you a perfect deed, if your vendor did not have title to transfer, the true owner can dispossess you. The only way you can be sure of your vendor's title is to obtain an abstract. An abstract is simply a copy of all the conveyances and legal proceedings affecting title to that piece of land which are on record in the county. Only a lawyer can tell you whether the abstract shows a satisfactory title in your vendor. The lawyer who examines the abstract can also tell you if the deed offered by your vendor is in proper form, so that it will have the effect of conveying a good title from your vendor to yourself, and corresponds to the requirements of the contract.

Two things the lawyer cannot do. He cannot tell if the land is in the possession of some third person who claims to be there rightfully. Such adverse possession, as it is called, may if continued long enough ripen into a title superior even to the record title. Even if the possession or use has not become title, it may signify a claim of which you are bound to take notice. You must investigate the possession and use for yourself, and inform your lawyer of what you discover, so that he may advise you of its legal effect. In the second place, your lawyer can't tell you whether the land described in the abstract and deed is the land you want to buy. Unless you are certain of that fact yourself, you must employ a surveyor, who will go to the farm you intend to buy and find out if its boundaries correspond to the description in the abstract and deed.

The purchaser should not pay for the land until he has received a written opinion from his attorney that the title shown by the abstract is marketable and that the deed tendered by the vendor will comply with the contract. The parties having gone through the steps suggested above, the last act is that of transferring title. The vendor hands over the deed properly executed and acknowledged by himself and wife (or husband) before a notary, and receives the purchase price from the purchaser.

Executing and Recording the Deed

There is a federal tax on the sale of real estate. It is the obligation of the vendor to buy the proper revenue stamps and put them on the deed before it is delivered. He may obtain them from the Post Office or, usually, from the county recorder.

When you have received the deed, take it *at once* to the recorder at the court house in the county seat of the county where the land lies and have him put it on record. If you do not do this, you run the risk that your vendor might sell the same land to some one else, who, if he bought in good faith and for value and promptly recorded his deed, might then have a better title than your own. Or though your vendor might be perfectly honest, he might be unfortunate in business, and a creditor who filed suit against him might acquire a lien against the land superior to your title. No intelligent purchaser delays in recording the deed he receives.

Selected excerpts from Circular 527, Mo. College of Agriculture

DOANE AGRICULTURAL DIGEST MAY, 1947
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DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

WHAT DO YOU SAY?

ABOUT THE MARSHALL PLAN--EUROPEAN RELIEF PROGRAM

I was asked by Senator A. H. Vandenberg, Chairman, to appear before the Senate Foreign Relations Committee on this subject. Here is some of the testimony.

WALTER P. REUTHER, President of the United Automobile, Aircraft, and Agricultural Implement Workers of America - CIO, made a vigorous plea -- "The American people gave of their finest manhood, plus $340 billion in money and goods, to win the war; we must not block their opportunity to make the final down payment, equal to between 5 and 6¼ per cent of the cost of the war, to win the peace...the future of the world is at stake."

EARL O. SHREVE, President, Chamber of Commerce of the United States, said -- "The businessmen of the country favor a carefully safeguarded program of assistance for sound economic reconstruction in Europe...we must guard against wasting the funds of our taxpayers or draining off our raw materials and finished goods to such an extent as to jeopardize our own strength..."

ALLAN B. KLINE, President, American Farm Bureau Federation, told the committee -- "I, along with millions of other farmers, share the deep conviction that our nation must meet the responsibilities of world leadership. Europe needs help in order to get started on the road to recovery...the mere shipment of food alone will not meet the problem...any aid program should be designed to help the people of the nations help themselves..."

PAUL M. MULLIKEN, Executive Secretary of the National Retail Farm Equipment Association, extended the offer of assistance by dealers..."to comb the farms for usable horse-drawn equipment, bring it in to the dealers' repair shops, thoroughly recondition it and make it available for shipment abroad..." He showed "tremendous" increases in farm equipment moved abroad as compared with pre-war as illustrated by the following:

	1938	1946
Russia	$ 147,000	$ 1,618.000
Poland	32,000	2.291,000
United Kingdom	3,496,000	3,972,000
France	1,386,000	11,754,000

My testimony, in part, was as follows --

IMPORTANT BASIC FACTS

(a) In European relief, we are engaged in a hopeless race with increasing population...There are 25 million more people in western Europe than before the war.

(b) From 1925 until 1942, we consumed more food in this country than we produced. We are normally "a net food importer".

(c) The population of the United States is rapidly increasing, and there are 11,000,000 more people than in 1940.

(d) The 30 per cent increased production of farm products during and since the war has, in a substantial measure, been due to the most favorable weather in our history and a heavy drain on our soil fertility.

PRINCIPLES AND PROCEDURE

The time allotted permits only bare statements of principles and a suggested approach -

1. Relief food shipments at government expense should be quickly tapered off, as European crops are harvested this year. (This assumes normal crop weather in Europe this season.)

Drs. Butz, Hardin and Young of Purdue University traveled in Europe last August and September making observations and contacting high agricultural and government officials. They also attended the International Conference of Agricultural Economists in England. Their observations quoted below are typical of others being made on the large measure of European recovery that has already taken place.

"The agricultural plant of western Europe is largely intact, and will respond quickly if the weather is favorable next year. The war did little damage to the agricultural plant except in relatively small areas of Holland, which were flooded, and in small sections of eastern France and western Germany where intensive fighting occurred. . .

"British nutritionists believe that the average Englishman is better nourished now than he was before the war, which is in line with our observation. This diet is the result of a rigid rationing program associated with a high level

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EUROPEAN RELIEF PROGRAM

of purchasing power. . .there is a more even distribution of the food supply. . .

"The food situation in the low countries, Denmark, Holland and Belgium, is fairly satisfactory."

LIVESTOCK NUMBERS in Europe are near the pre-war averages except for hogs and poultry.

POWER FOR FARMING apparently is equal to or above pre-war. The 200 thousand more tractors have more than made up the one million shortage of horses. Furthermore, the "Output (of medium and light tractors by the 16 nations.) already more than double the pre-war average, is scheduled to be more than ten times that pre-war figure by 1951"

There is no doubt in my mind that the people of this country would never have approved giving the following staggering sums for foreign aid since the war, if asked to vote these amounts as a direct tax on themselves.

July 1, 1945 through June 30, 1947 -- 2 years -- $183 for every man, woman and child. $616 for each family in the United States. (See Senator Kem's speech in the Senate, January 16, 1948)

Assuming the same rate has continued, the contribution to foreign aid since the end of the war, by June 30 of this year will be over $900 per family.

2. The Government has a solemn obligation to protect the 250 billion dollar Federal debt held by the citizens and financial institutions of this country. This means that the debt should be rapidly reduced during this boom period.

3. Inflation needs to be stopped. Reduced shipments abroad are admittedly a major way to accomplish this.

4. A first need is to keep our country strong by conserving our resources.

Our soils are being mined under the stimulus of inflated prices. Soils adapted only to grazing continue to be ruthlessly plowed up in the gamble to cash in on $3.00 wheat prices induced by the huge relief shipments. The "dust bowls" to follow will make those of the last drouth period seem small indeed.

Dare we further weaken our future productive capacity by exhausting our land and other natural resources by continuing the heavy drain of the war years long after the war is over? What if another war should come?

5. The limit on any further foods and goods to be sent abroad should be set by such measures as, --

The amount of surplus, if any, that can be exported without inducing further inflation.

6. There is surplus animal power and equipment here in the United States that can be used for European relief.

7. Put further European aid on an incentive basis. I find people very positive on this point.

Farmers who work six and seven days a week in this country are not very tolerant of the reports of European miners and other laborers working only three days per week or only long enough to buy what their ration stamps permit.

8. Further government expenditures abroad should be put as nearly as possible on a business basis, under the able business administration of industrialists and farmers of this country.

The December Statistics of the United Nations, using 1937 as an index of 100, shows industrial production in September, 1947 was: Poland, 133; Norway, 120; Sweden, 107; Netherlands, 96; Germany (1936 base) American Zone, 48; France, 97; Denmark, 104; and Belgium, 84.

Except for Germany, industrial production is practically back to pre-war levels. Reconstruction presumably can be shifted onto a business basis -- preferably financing specific projects of known merit.

9. Private relief can be increased to replace some of the Federal food relief as it is withdrawn. In this manner, individuals and institutions can freely express the extent of their desire to help foreign people with their continued gifts of food, clothing and money.

SUMMARY— This approach suggests --

A. Early termination of government financed foreign relief.

B. Continued and expanded privately financed relief programs.

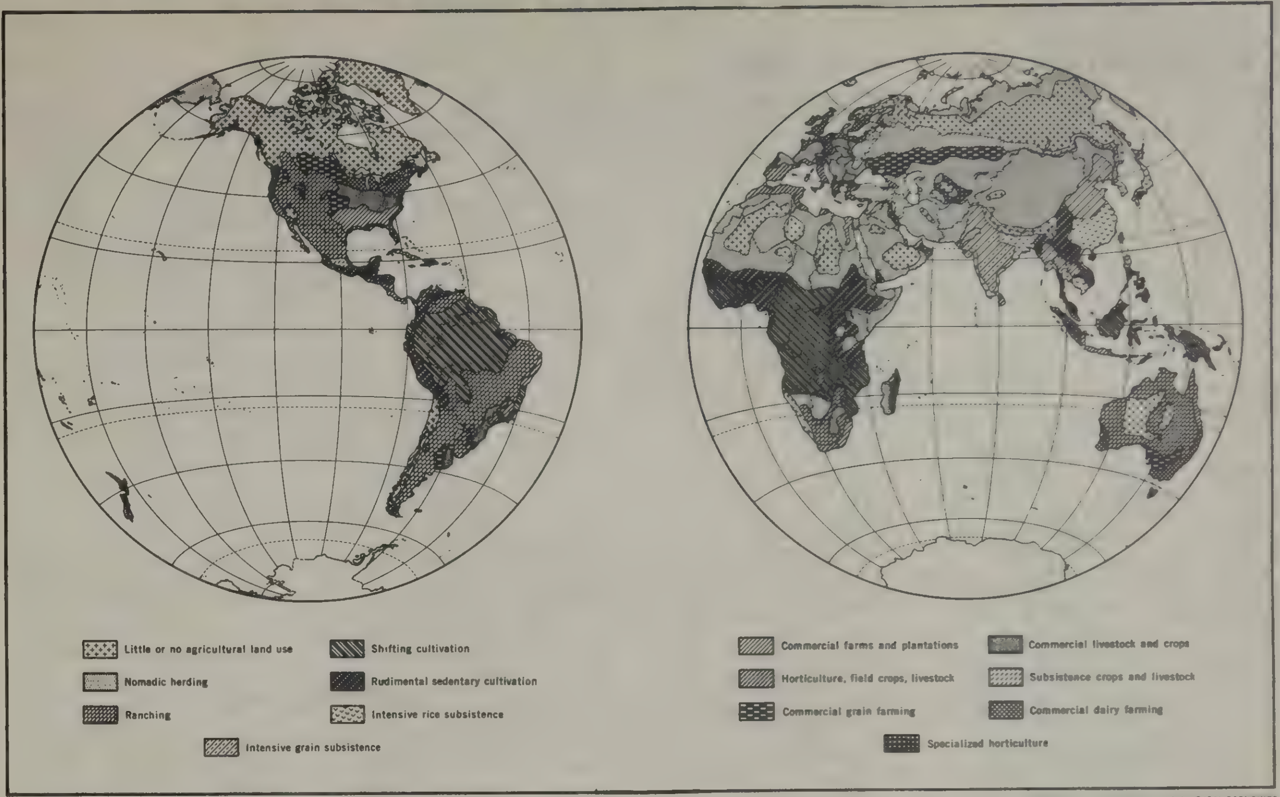
C. Limited use of further Federal funds for European rehabilitation as loans or on the basis of other business arrangements.

This approach would give continued participation in the reconstruction problems of the cooperating nations of western Europe.

True D. Morse *President*
Doane Agricultural Service, Inc.
Editor, Doane Agricultural Digest

ADDITIONAL COPIES *of this page will be furnished* ***FREE*** *in limited quantities if you desire them for distribution. You should tell your Congressmen what you want them to do regarding this huge European Relief Program*

AGRICULTURAL REGIONS OF THE WORLD


▨ Little or no agricultural land use
▨ Nomadic herding
▨ Ranching
▨ Intensive grain subsistence
▨ Shifting cultivation
▨ Rudimental sedentary cultivation
▨ Intensive rice subsistence
▨ Commercial farms and plantations
▨ Horticulture, field crops, livestock
▨ Commercial grain farming
▨ Specialized horticulture
▨ Commercial livestock and crops
▨ Subsistence crops and livestock
▨ Commercial dairy farming

U S DEPARTMENT OF AGRICULTURE

NEG 43845 BUREAU OF AGRICULTURAL ECONOMICS

FACTORS DETERMINING DISTRIBUTION OF AGRICULTURAL LAND

About 3/8 of the earth's surface is land and only about 12% of this land is adapted to cultivation.

Only about one-fourth of this arable land is rated as good to excellent.

The terrific pressure of population on this relatively small amount of good crop land is emphasized by the millions of people now starving. Most people go hungry at some time each year and the world is never free of death by starvation.

Climate is the primary controlling factor in the location of agricultural lands--temperature, moisture, light, atmospheric pressure, air currents, and the duration and frequency of their periodic extremes.

Parent soil material is not necessarily of primary importance in determining the quality of soil. Identical parent rock under varying climatic conditions will form soils of greatly differing physical and chemical properties. (See Pages 601-602 Digest) However, certain types of parent rock never form good agricultural soils.

Based on U.S.D.A.
and Other

Temperature extremes are withstood by many plants if the periods are not of too long duration.

Moisture available for plant use is the dominant environmental factor.

Light exposure increases the loss of water from plants and soils, exaggerating the harmful effects of low amounts of moisture.

Winds either modify or intensify the effects of other climatic factors in addition to creating such extreme climaxes as tornados and typhoons.

Man has successfully overcome some of these limitations by such means as irrigation, drainage, shelter belts, and plant selection and breeding. Ignorance; superstition; lack of tools, good seed and livestock; and lack of pest controls and knowledge of how to use them will long stand in the way of maximum food production. There are, however, definite practical limits to future developments.

This broad view of world food production capacity helps one to reach reasonably sound conclusions as to the future supply of, and demand for, food.

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

WORLD CROP DISTRIBUTION

WORLD DISTRIBUTION OF MAJOR CROPS

WHEAT-The 12 great wheat producing areas are: (1) The Northern Great Plains area of North America, (2) The Southern Great Plains area of the United States, (3) The Columbia River Basin and Palouse area of the U.S. (4) Northwestern Europe, (5) The Mediterranean area of Europe and North Africa, (6) The Hungarian Plains, (7) The Danube Basin, (8) Southern Russia, (9) Northwestern India, (10) East Central China, (11) Argentina, (12) Southeastern Australia.

Wheat is grown under a variety of climatic conditions. It is better able to adapt itself to varying soils and climatic conditions than many other plants.

RYE- Winter hardy and early maturing, rye is widely grown as a bread crop in cold climates and on thin sandy soils. Of all the grain crops, it is best able to withstand the severest conditions. Europe produces about 96 per cent of world's supply of rye.

BARLEY-This grain matures in a shorter growing season than any other cereal. It escapes drouth rather than resists it, but is sensitive to unfavorable drainage conditions.

Barley is very important in the Mediterranean area of northern Africa and Southern Spain and is grown in India during the winter half-year. It is primarily a feed crop, with malt being its second most important use.

OATS- Oats are well adapted to a wide variety of soil types. About all that is necessary is fair drainage and ample moisture. For this reason, they often follow a heavy feeder crop, such as corn, in the rotation.

As might be expected, oats are most widely grown in moist temperate regions and are almost completely confined to Europe and the U.S.

RICE - This crop is most important in the densely populated Orient and humid tropical areas. No other crop is better able to support heavily populated areas. Per capita consumption in the United States is 6 pounds per year; in India, Korea, French Indo China, Java, Madeira and the Philippines, it is over 200 pounds; and in Siam, Taiwan and Japan, 300 to 400 pounds per year.

CORN- Corn requires relatively high temperatures during a growing season of 140 or more days.

It is the chief crop of the United States where about 50% of the world total is grown. Argentina grows 7.4% and China 5.3%. Corn is grown on more U.S. farms than any other major crop.

"Corn is more widely distributed over the world than any other cereal, which means that it has exceptionally wide adaptability." Varieties vary from 2 feet to over 20 feet in height.

SORGHUMS-This crop is grown where rainfall is limited or soil conditions are so unfavorable that corn yields are undependable. It also withstands high temperatures and has many uses which vary in different parts of the world.

In some sections of the old world, it has long been a staple food crop. In other sections such as Bombay and Madras, Northern China, Manchuria and Korea, Western Asia and parts of Africa, the crop is depended upon as a human cereal as well as an animal feed. In the United States it is used almost exclusively as a forage and grain crop. Its introduction into the Southern Great Plains area has done much toward stabilizing the agriculture of that region.

MILLETS- The uses of millets and the sorghums are very similar. Parts of Asia and Africa use the crop as an important human cereal while in the United States it is used solely as a livestock feed. Millets occupy the poorer land and the sorghums the better.

EDIBLE LEGUMES-Where livestock production and the utilization of animal products are limited by population pressure, environmental conditions or other stresses, the edible legumes are used as meat substitutes or to furnish the necessary proteins in the diet. Such legume seeds as soybean, mung bean, velvet bean, sieva bean, lima bean, urd bean, and lentils are extremely important in the diet of the masses of people in the Far East, the Balkans, the Mediterranean countries and Brazil.

POTATOES-Europe produces about 92% and North America 6% of the world's potato crop. Even so, the total world production is far larger than that of any cereal. From 1930-31 to 1934-35 the average yearly production of the world's important food crops was:

CROP	MILLIONS OF TONS
Potatoes	227
Wheat	165
Corn	129
Rice	109
Oats	69
Barley	53
Rye	52
Beans	6

SUGAR-The canes are acclimated to the tropical and sub-tropical regions only. There they are so widely distributed that any attempt to group them would be valueless.

The sugar beet, like the potato, is largely a European crop, where about 85 per cent of the world total is grown.

VEGETABLE OILS

Principal commercial vegetable oils are: cocoanut, palm, palm kernel, olive, china wood or tung, cottonseed, corn, linseed, peanut, soybean, safflower, perilla, castor, sesame, hempseed, poppy and rape.

COTTONSEED is a by-product of the cotton fiber industry and is produced principally in the United States, Egypt and India.

FLAXSEED is the source of linseed oil. Argentina is the world's greatest producer followed by the U.S.S.R., India, United States and Uruguay in the order listed.

SOYBEANS have always been very important in the Orient. Their rise as a major crop in the United States in the last 25 years has been one of the phenomena of American agriculture. They now furnish a major cash crop for the Cornbelt area as well as seed and forage for other areas of the United States.

SAFFLOWER has been grown for many years in India and Egypt and is a new oil crop in the United States.

FIBER CROPS

Cotton is by far the most important of the fiber crops. The United States is the most important producer, raising approximately 56 per cent of the world total, and India next in production with 17 per cent. It is the dominant agricultural export commodity of the United States.

FLAX for fiber is produced primarily in Russia and in the countries around the Baltic Sea.

HEMP is of great importance in Russia, Italy and Hungary. It is of minor importance in the United States.

FORAGE CROPS

Throughout the world, wherever livestock is raised, there is interest in forage to supplement grazing. Hay, fodders and silage and other such feeds are a necessity where grazing animals must be carried through winter and other periods when grazing is not available.

Forage crop production is usually most developed in those areas of the world where there is intensive use of land for dairying and beef production.

AGRICULTURAL SURPLUS AND SCARCITY

"Rough estimates show about four billion acres of arable land, upon which the world must depend for food. This is scarcely 2 acres for each of the world's 2 billion people.

"In some countries there is less than one acre per person despite the estimate of certain nutritionists that 2½ acres of fairly productive land are needed to produce an adequate diet for one person.

"The quality and productiveness of food-producing lands vary greatly from one region to another. Only about one-fourth of the world's arable land is first-class and it is unequally distributed."

Yet, seven years ago our chief concern was with agricultural surpluses. Today our worry is scarcity. Which is the true picture? Are they both true from time to time? Certainly, there are millions of starving people in Europe and Asia today, just as certainly as there were piles of wheat rotting on the ground in our Wheat Belt a few years ago for want of storage space or markets.

ESTIMATED CONTINENTAL EUROPEAN SELF-SUFFICIENCY IN FOODSTUFFS BETWEEN 1936-38*

COUNTRY	DEGREE OF SELF-SUFFICIENCY
Deficit Countries:	Per Cent
Norway	43
Belgium	51
Switzerland	52
Netherlands	67
Finland	78
Greece	75
Austria	75
Germany	83
France	85
Czechoslovakia	95
Sweden	91
Portugal	94
Italy	94
Spain	99
Surplus Countries:	
Estonia	102
Denmark	103
Poland	105
Latvia	106
Yugoslavia	106
Bulgaria	109
Lithuania	110
Rumania	110
Hungary	121
Continental Europe:	
Deficit Countries	84
Surplus Countries	108
Total	91

Per Cent of Self-Sufficiency in Asia	
China	99
Japan	86
Manchuria	85
French Indo China	145
Thailand	188
Burma	260

"For continental Europe as a whole, food self-sufficiency on a calorie basis amounted to about 90 per cent."*

We Americans are now suffering, if one can call it that, from a scarcity of over-supply among a certain few articles which we have been accustomed to getting easily. Measured by usual living standards, there is no scarcity of food now in this country; by contrast, there is real want, real scarcity, real starvation in Europe and Asia.

Even now, with demand far ahead of supplies of former so-called surplus farm products, we still have surpluses of wool, certain grades of cotton and other products. This does not mean that our population has all the clothing and other cotton and woolen products it wants--indeed badly needs. Nor does our record food production mean that an adequate minimum diet for general health and efficiency is available to every person. The selective service records bear tragic testimony to this fact. From a national point of view, there are very few real surpluses, while internationally there are none. Yet, we normally have farm products piled up here and people starving there. Why?

"Further inquiry into this problem suggests that the key to a secure, adequate, and suitable supply of food becomes one of access to the products of land regardless of where the land may be located or in whom control may now be vested. In support of this conclusion, the natural distribution of land resources and the economic and social forces affecting their use do not permit them to be divided among nations in proportion to population. Furthermore, the distribution of land resources and the products of land among individuals within a nation appear to be perhaps more important than the distribution among nations and is certainly more difficult to work out internationally."

DISTRIBUTION OF AGRICULTURAL RESOURCES

Of all the resources of the world, land suitable for agricultural use is best distributed. Yet the best has proved to be none too good, as may be seen by comparing a world population map and the map of the agricultural regions of the world. (See Digest Page 1205-1206)

Many wars have been waged over control of agricultural land. Lack of outlets for populations grown too large for their sources of food has produced nations with "have not" psychologies. This state of mind is the foundation of the problems which the International Food Conferences are trying to solve. It is agreed that the answer is one of access, for every living person, to food needed to maintain health. However, the method of access is not so well agreed upon.

ACCESS TO WORLD AGRICULTURAL RESOURCES

There have been two main methods of access to agricultural resources in the past--that of direct land acquisition by conquest (nicely called "Shifting of National Boundaries"), and the migration of peoples onto virgin land.

The first has rarely proved successful, even temporarily; and the second, as in the case of

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* Foreign Agriculture--August 1942--U.S.D.A. Vol. VI, No. 8--April 1942--Vol. VI, No. 4.

AGRICULTURAL SURPLUS AND SCARCITY

America, although proving successful for the numbers which did migrate, took care of only minor fragments of the world's undernourished millions. There are still opportunities for migration to virgin or underpopulated regions, but political complications make this process increasingly difficult.

A third method, which entails neither political boundary shifting nor mass migration of peoples, is that of access, through unhampered movement of products of all kinds, between areas of optimum production. Almost every area has optimum conditions for one or more products. Under present transport conditions these areas need not be forced into uneconomical production of products necessary to good living.

The barriers which have arisen against ease of access have been political, and, as such, artificial. In direct contrast to this is the tremendous progress that man has made toward breaking down physical barriers between peoples.

1776 - 1946

Remote parts of the world for all practical purposes are now more easily accessible than were many of the original thirteen American colonies to each other in 1776. In spite of the breakdown of physical barriers that once prevented access to raw materials, our social and economic thinking has not kept pace with these advances.

"This indictment is doubly significant in light of the availability of modern methods of production, transportation, storage and marketing which would bring forth more adequate food for all.

"In the Orient, famine claims the lives of many people while national policies in other parts of the world may be regulating downward the production of food. Even in countries like the United States where food is seemingly plentiful, many people remain underfed and many suffer from serious nutritional deficiencies.

"Considering world-wide dietary deficiencies, in kind and quantity of food, in terms of the Conference standards, the potential demand is tremendous. To satisfy this demand would bring new lands into use and would force a more intensive use of those already in cultivation."

The Quebec U.N. Food Conference had the following to say on marketing: "It would be useless to increase the output of food, it would be equally futile to set up optimum standards of nutrition, unless means could be found to move the food from the producer to the consumer at a price which represents a fair remuneration to the producer and is within the consumer's ability to pay."

PRESENT TRENDS

Except where large nations are forcing their smaller neighbors, and not necessarily to the latter's advantage, to cooperate economically, the present trend in world agriculture was fairly well summed up by Mr. Swanger, Federal Employee in Exports, in an address before the American Farm Economics Association late last year:

1. "We face a smaller or shrunken world market, as compared to the pre-war markets.
2. "The effect of the war has been to increase Nationalism. All countries want to be self-sufficient as far as food and clothing are concerned.
3. "Most of the countries which formerly bought our products were forced during the war to increase their home production; i.e., England plowed up much pasture. Some countries actually increased their total calory production to a point equal to pre-war production and purchases. This applies not only to food but also to fibres, when synthetic fibres are considered.
4. "Foreign buyers will have wide selection as to source and prices; hence a buyer's market.
5. "Our share of the export market has steadily declined for a long period from 70 per cent of the total until just before the war to 17 per cent.
6. "Our Agricultural Adjustment Act has adversely affected our ability to compete in exports.
7. "Our buyers now have a very small supply of American dollars and little chance of getting more--i.e., we are not buying and importing.
8. "Laws affecting imports by other countries are generally against us--quotas, tariffs, exclusions and Empire preference.
9. "Trading, particularly in agricultural products, is not now on a free-market basis, but under strict government control in most countries.

BASIC PROBLEM

"Production of foodstuffs should gravitate to those areas where they can be produced with the least cost. The Hot Springs Conference recognized this principle when the representatives of the United Nations agreed that the inherent, natural and economic advantages of any area should determine the farming systems adopted and the commodities produced in that area. One of the acid tests of the success of this and food conferences yet to be held, is the degree to which this principle is applied. Only by all nations working together and giving full recognition to these fundamental laws of land utilization can universal freedom from want of food ever be established.

". . .Nations and people without access to the produce of the lands of the world would continue to constitute a latent and genuine threat to a lasting peace."

CONCLUSION

There are underfed people in the United States as well as abroad.

There are never any real surpluses of food. The problem is a lack of proper distribution. When so-called surpluses appear, they are the result of political laws and regulations which have caused food and other materials to accumulate. There is never a lack of need or wants.

This country cannot "feed the world". In fact, imports averaged 5 per cent above exports prior to the war.

One primary long-time, sound solution is to show other countries how to build optimum production on their lands while furnishing them with access to needed agricultural products of other regions.

Quotations where not otherwise credited are from--Distribution of World Land Resources--John F. Timmons, in Land Policy Review, Winter 1944--Vol. VII, No. 4.

ARGENTINE CROP ACREAGE

Argentina is the world's largest exporter of corn and second largest exporter of wheat - see DIGEST page 181. These are both major crops of the United States, and wheat and corn of both countries compete for the world markets. Facts in regard to the agriculture of Argentina are therefore of definite interest.

The total acreage devoted to the major crops of wheat, corn, barley, and flax has shown no material increase since the 1930-1931 crop season, but there seems to be a slow conversion of grazing land to crop production. There are, however, definite climatic and soil limitations that make it doubtful if there will be any material acreage increase until prices are much higher than at present.

The acreage planted in leading grain crops for representative years has been as follows:

Year	WHEAT - Acres	CORN - Acres	FLAX - Acres	BARLEY - Acres	TOTAL - Acres
1912-13	17,095,000	9,464,000	4,695,000	267,000	31,521,000
1917-18	17,875,000	8,715,000	3,234,000	604,000	30,428,000
1922-23	16,254,000	7,851,000	4,317,000	599,000	29,021,000
1927-28	20,690,000	10,739,000	7,055,000	1,186,000	39,670,000
1932-33	19,790,000	14,539,000	7,401,000	1,554,000	43,284,000
1937-38	18,908,000	15,185,000	7,023,000	1,942,000	43,058,000

Wheat, which occupies a larger acreage than any other crop, is produced on a relatively small area almost wholly within 150 miles of the principal export ports. This production is in the central productive region generally referred to as the cereal and livestock zone. This comprises less than one-fourth of the country and is surrounded on three sides with comparatively arid land of low agricultural value. The cereal zone is roughly equivalent to the combined areas of Illinois, Iowa, and Missouri.

Wheat yields vary from about 20 bushels in the small central highest yielding areas to 6 bushels per acre on the western edges of the wheat growing zone. Representative average county yields from 1929-1930 to 1934-1935 were as follows:

County	Average - Bushels	Low	High
Chacabuco	18.6	14.7	22.0
Marcos Juarez	15.8	9.2	22.0
Tres Arroyos	14.4	13.4	18.1
Juarez Celman	10.8	6.1	14.7
Puan	8.0	1.8	12.0

Wheat seeding of winter varieties begins in April and continues into June. Harvesting starts about Christmas.

Corn yields in zones of highest averages are 35 bushels per acre. In the remaining crop areas corn yields per acre in general do not exceed those of wheat and in the northwest and southwest are distinctly less than wheat yields.

Yields per acre and production of Argentine crops have been as follows:

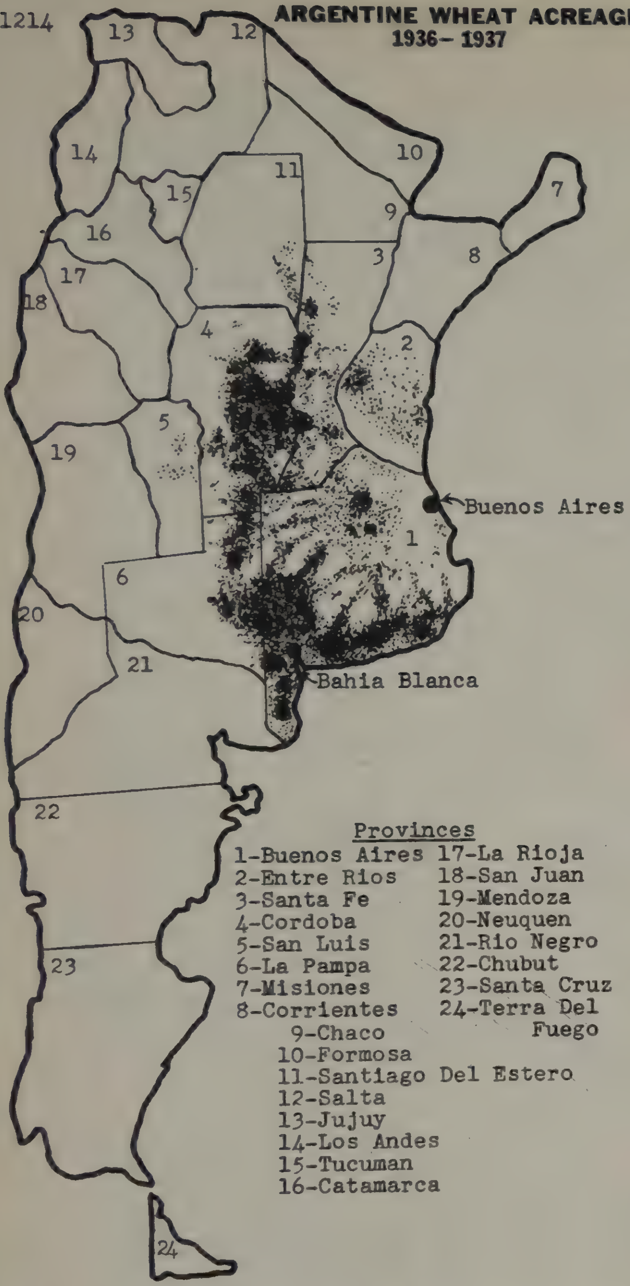
	9-Year Average - Bu. Per. A. 1925-1926 to 1936-1937	Production - Bushels Av. 1925-26 to 1936-37
Wheat	13.54	236,982,000
Corn	30.72 (8 Yrs.)	323,555,000
Barley	20.33	22,765,000
Oats	30.44	60,469,000
Rye	10.39 (7 Yrs.)	6,573,000

Soil differences account for much of the variation in wheat and other crop yields. A small central region of the cereal zone has a fertile black silt soil recognized as one of the best soil types in the world. To the north of this area the soils contain more clay and are less friable but are fertile and productive. To the west and southwest the soils are lighter in texture and color and lack productive capacity. There are large areas of sandy soils and soils already exhausted by continuous cropping. On extensive areas the soils are shallow, being closely underlaid with limestone that frequently outcrops.

Rainfall varies from about 40 inches on the east to less than 20 inches on the western side of the cereal zone. In general the distribution of the rainfall in relation to the growing season is poor, and high evaporation reduces its effectiveness.

Based on Data of U.S.D.A.

ARGENTINE WHEAT ACREAGE
1936 – 1937



Livestock grazing continues to be the dominant use made of land even in the grain-producing regions. In only a small part of the cereal zone has crop competition reduced the pasture acreage below half of the land area. Much of the pasture land is desirable for crop use.

Very little grain is fed to livestock, so the cattle and sheep industry is based almost entirely on grazing.

Livestock continues to use so much of the better soils because alfalfa is easily grown. There are about 12,000,000 acres of alfalfa. It provides excellent pasture for nine months of the year and makes possible the finishing of large numbers of steers exclusively on pasture.

The agricultural aristocracy of Argentina is built on the livestock grazing industry. The "social standing" attending the industry has been a factor in resisting the shift from the "Estancia System" to grain production. There is a definite inclination not to mix grain and livestock farming.

Large land holdings are the rule. Most of the estancias, livestock farms or ranches, are from 6000 to 12,000 acres in size but there are many holdings of 75,000 acres or more. In the grain growing regions the average size of farms varies from about 370 to 1200 acres.

Tenants produce about 75 per cent of the wheat, giving from 25 to 30 per cent of the crop as rent. Cash rents are equivalent to $2.00 to $3.35 per acre. (Based on 1 peso = 33 cents.)

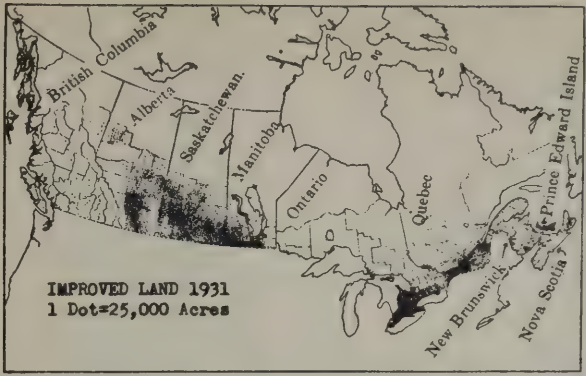
Land values are equivalent to about $16.00 to $47.00 per acre. The average investment in houses and machinery ranges from $1500 to $5000. Tenants are required to build their own houses.

Farm labor receives, including food, about $17.00 per month.

Italian and Spanish tenants, mostly foreign-born, predominate in the grain-growing areas. Since 1929, returns have been low and living standards of tenants are correspondingly low.

Argentina is exceeded by a number of countries in the production of corn and wheat but it leads all countries in corn exports and ranks second only to Canada in wheat exports. No great change has taken place in total crop acreages in the past eight years, and there is no large undeveloped acreage well adapted to grain production. The further expansion of crop production that is slowly taking place is at the expense of the livestock industry.

CROP AREAS IN CANADA



IMPROVED LAND 1931
1 Dot=25,000 Acres

The topography of Canada tends to definitely segregate the farming areas. Mountain ranges run north and south in the western part and the Pre-Cambrian or Canadian Shield, stretches over a large part of Ontario and Quebec.

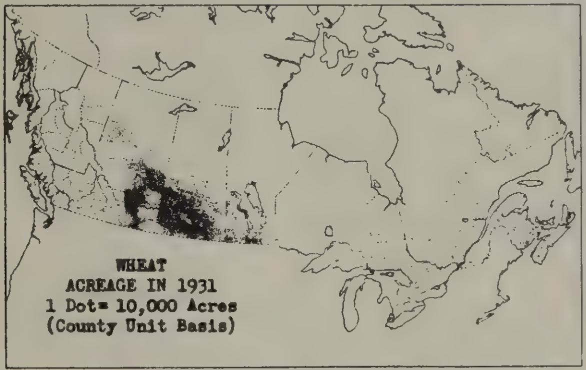
Between these two rocky areas is the northern extension of the North American Plain. The northeastern extension of this plain occupies Southern Ontario and extends east along the extreme south edge of Eastern Canada. It is largely designated on the accompanying maps by the areas of improved land and by the regions of agricultural production.

The Interior Plains Region is in the three Prairie Provinces and is the great wheat producing section of Canada.

Wheat is the dominate crop making up 45.5 per cent of the total field crop acreage in 1930. Oats were second with 22.2 per cent of the acreage. The following figures show the leading crops and acres according to the 1931 census:

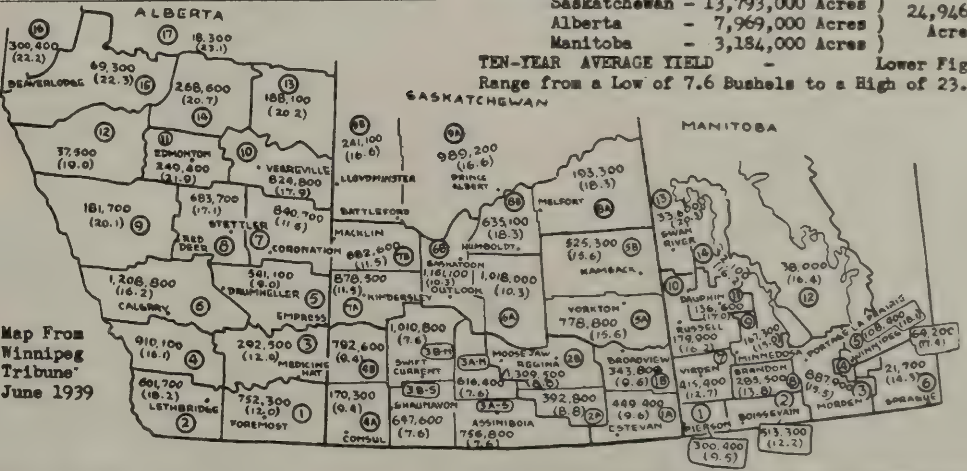
Crop	Acres	Crop	Acres
Wheat	25,600,000	Buckwheat	351,000
Oats	11,600,000	Turnips	105,000
Barley	4,900,000	Vegetables	104,000
Rye	1,100,000	Beans	90,000
Mixed Grains	1,100,000	Peas	73,000
Flax	662,000	Tobacco	48,000
Corn	426,000	Sugar Beets	32,000
Hay	9,600,000	Potatoes	22,000

<ins>Canada exports 7 to 8 times as much wheat as the United States</ins> and almost as much as Argentina and Australia combined. The exports equal <ins>almost one-half of the total imports of Europe</ins>. (See Digest page 181)

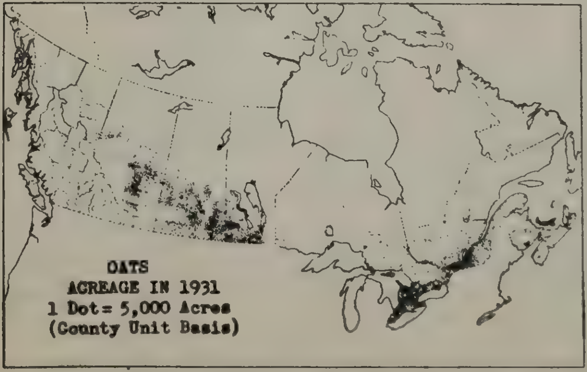


WHEAT
ACREAGE IN 1931
1 Dot= 10,000 Acres
(County Unit Basis)

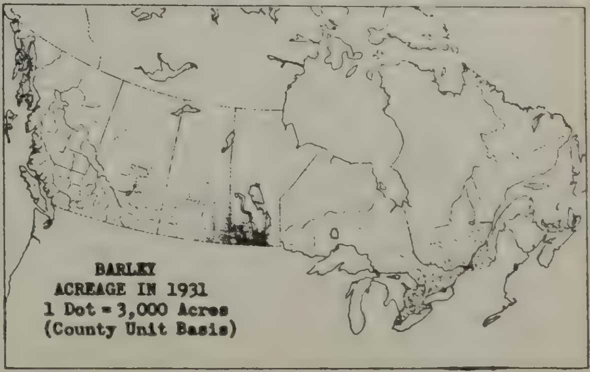
PRAIRIE PROVINCES OF CANADA
SPRING WHEAT ACREAGE, 1939, by Crop Districts - Top Figure
Saskatchewan - 13,793,000 Acres)
Alberta - 7,969,000 Acres) 24,946,000 Acres
Manitoba - 3,184,000 Acres)
TEN-YEAR AVERAGE YIELD - Lower Figure (15.6)
Range from a Low of 7.6 Bushels to a High of 23.1 Bushels.



Map From
"Winnipeg
Tribune"
June 1939



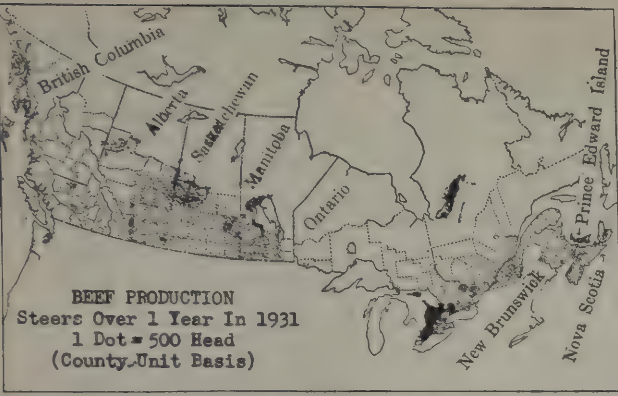
OATS
ACREAGE IN 1931
1 Dot= 5,000 Acres
(County Unit Basis)



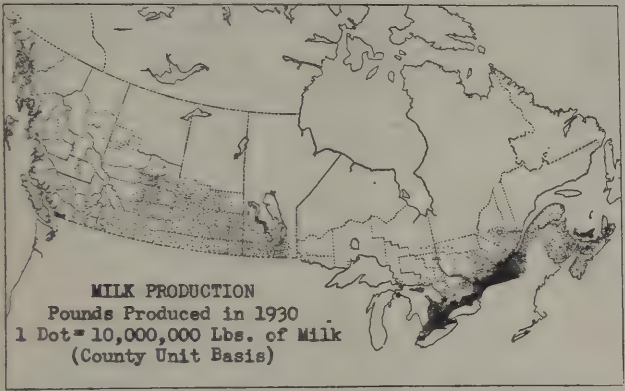
BARLEY
ACREAGE IN 1931
1 Dot = 3,000 Acres
(County Unit Basis)

Maps (Except Where Noted) and Data From Pub. 653, Dominion of Canada, Department of Agriculture, I. S. McArthur and J. Coke

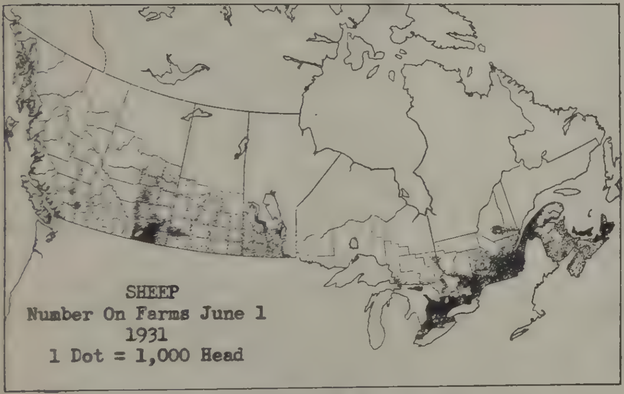
LIVESTOCK AREAS IN CANADA



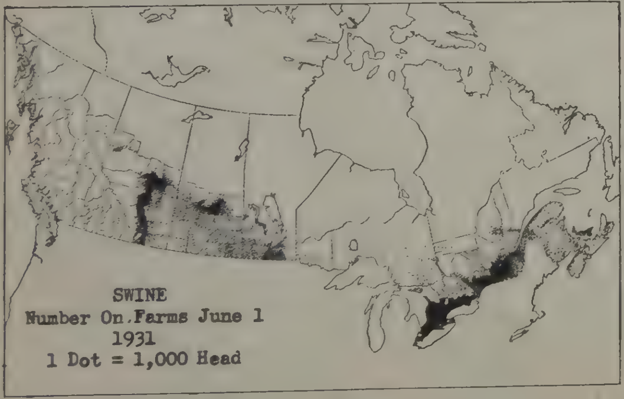
BEEF PRODUCTION
Steers Over 1 Year In 1931
1 Dot = 500 Head
(County Unit Basis)



MILK PRODUCTION
Pounds Produced in 1930
1 Dot = 10,000,000 Lbs. of Milk
(County Unit Basis)



SHEEP
Number On Farms June 1
1931
1 Dot = 1,000 Head



SWINE
Number On Farms June 1
1931
1 Dot = 1,000 Head

Maps and Data From Pub. 653, Dominion of Canada, Department of Agriculture, I.S. McArthur and J. Coke

Livestock is found to some extent on practically all farms in Canada. The relative importance is shown by the following 1931 census numbers:

	Number of Head
Cattle	8,100,000
Hogs	4,800,000
Sheep	3,600,000
Horses	3,285,000
Poultry	70,800,000

Horses - There has been a considerable mechanization of farm power in Western Canada but the great majority of farmers in the Dominion still depend on horses for their farm power. Generally, individual farm operators raise their own horses, but there are some actual horse ranches, chiefly in the foothills area of Alberta.

Cattle - Cattle are raised to some extent on practically all farms. Close to urban centers of the East fluid milk production is a major farm enterprise. Beef production is important in all three Prairie Provinces particularly in the northern and western parts. There is an important ranching area in Southern Alberta extending into the southwestern portion of Saskatchewan.

Sheep - In most provinces of the Dominion farmers keep a small flock of mutton sheep as a cash producing side line. In Western Canada some sheep ranching is carried on in special areas. Here the wool-producing breeds predominate. There has been little change in the number of sheep for the past 50 years.

Hogs - Pork production developed only to satisfy the domestic market but recently pork products have become important exports. With the start of the present war the production for export is being rapidly expanded. Bacon type hogs are now produced almost exclusively.

Poultry - Most farms have poultry at least sufficient for home needs. Flocks are small and as a rule are given little attention. Near urban centers there are some commercial enterprises.

Fur Farming - There has been a rapid development of fur farming both as a major business and as a side line. Fox is the predominate animal raised for fur, but muskrats and mink are also reared. The following shows the number of fur farms, 1931, in the leading provinces:

Quebec	- 2,043 Farms
Ontario	- 1,218 Farms
New Brunswick	- 753 Farms
Prince Edward Island	- 648 Farms

Beekeeping - Beekeeping has been increasing and is a side line on many farms. There are a number of large apiaries.

- - - - - - -

Some Canadian livestock comes into the United States for finishing and marketing. Unquestionably many more cattle particularly, would be produced for sale in the States except for the tariff barrier.

WESTERN EUROPE - NOW

BY J. G. Russell

Jim Russell, Farm Editor of the Des Moines Register and Tribune, has just returned from a trip to Europe on which he accompanied a group of Iowa farmers. These men paid their own way to see conditions in England and Western European countries. In the following account Mr. Russell describes conditions as this group saw them and gives facts to guide your attitude toward the tremendous European problem.

ENGLAND — Food production in England currently is running about 30 per cent above prewar, although the drought this year will cut down the output.

The increase has been due largely to plowing up some of the grass and farming some of the estates previously used chiefly as hunting preserves.

Mechanization has been quite rapid in much of England and an agricultural revolution is in progress. Its expansion now is slowed down by lack of machinery and parts, repairs and shortage of fertilizers. The lack of labor is being supplied in part by women working in the fields and by use of German prisoners of war.

The new agricultural program calls for increased emphasis on livestock instead of concentrating on crops for direct consumption, such as potatoes and wheat, as has been the case in the past. Price guarantees extending over the next four years have been announced. Indications are that production of meat, milk, poultry and eggs will be attractive.

The farmers have little sympathy for the labor government, but admit that they are receiving fair treatment under the new price guarantee program. Food is strictly rationed and, while adequate at 2,800 calories daily, is very uninteresting and rations have been lowered only recently. Farmers seem to be responding fairly well to government appeals to turn in food.

Lack of activity in coal mining and lack of dollars to buy food and other needed imports continue to hamper England and the general financial and economic outlook is unsettled.

SCOTLAND — Conditions prevailing in Scotland are similar to those in England except that the Scots seem to be working hard and displaying lots of activity. Scotland also suffered from unfavorable crop weather.

Livestock appeared to be in good condition, although dairy herds lacked enough feed, both in the form of grain and protein supplement, to get best results.

The Ayshires, Friesians, Angus and Shorthorns were noticeably of high quality. The Scotch are making rather slow progress in mechanizing their farming but are working in that direction.

FRANCE — French farmers are making some comeback from wartime conditions, although the use of manpower on farms is mostly quite wasteful. Some of the larger farms have tractors but there is complaint about the shortage of farm implements and of repairs for tractors and implements. They also lack fertilizer and German prisoners of war are being used on many farms. The smaller farms are pretty badly cut up and are not farmed very efficiently. Rotations generally are good on the French farms and they make good use of barnyard manure.

The Normandy cows are most widely used in the Normandy province while Friesians, Guernseys and Jerseys are found elsewhere in France. In some parts of France, cattle are triple-purpose--milk, beef and work animals.

Production is hampered this year by drought following winter freezing of the wheat.

Lack of a stable currency is hampering government efforts to induce farmers to sell off some of their cattle to save badly needed grain and also to turn farm produce over to the government for distribution. There is considerable black marketing caused by this lack of confidence in the currency and apparently some lack of confidence in the government.

The bread ration recently has been cut to 200 grams daily (7 ounces) from 250 earlier this year and before then, 300. Rationing and price control are not enforced any too well. Folks who have money can eat well in Paris but the poor people are having a tough time.

The big labor union is communist dominated and the cut in bread ration has been seized on by the Communists to agitate against the government. Further cuts in food rations might cause serious trouble.

GERMANY — Germany is very flat and very little recovery could be noted along any lines. Agricultural production is 35 per cent below prewar in the American and British zones which are administered as a single unit. Population in the two zones is up 25 per cent. This is due largely to influx from territory now under occupation or influence by Russia or some of the satellite countries.

Drought which cut the potato crop was a real tragedy in Western Germany this year and intensified the food problem. Some of winter wheat was being planted in dry topsoil in mid-September.

Currency instability is even more of a problem in Germany than in France. No one knows what the German mark is worth. The farmer is inclined to hold back his produce for barter because money is worth very little and there is nothing that he can buy. Black marketing is rampant and cigarettes are widely used in bartering and for transactions on the "open" or black market.

Cities are flat from bombing and little has been done to restore them. Germany has no lead-

(Continued on back of page)

WESTERN EUROPE

(continued from front)

ership and is badly in need of some sort of restoration or recovery, economically. This is holding up recovery of all of Europe. The Ruhr Valley with its coal fields is especially needed for industrial production to be restored.

Agriculturally, it will be a long time before Germany is on an efficient basis. Farming is inefficient, with oxen and milk cows widely used for power. Efficient operation is impossible on the small, cut-up farms. Many farms are composed of as many as 12 to 15 widely separated tracts.

Fertilizers are lacking for best crop production and machinery is needed throughout western Germany. Food and agriculture officials said that some good county agents from the United States would help more to spur production than any other one thing.

Food supplies are very short with the official ration of 1,550 calories being met only with difficulty in September and in some cases the lack of potatoes caused it to be short of 1,550 and nearer 1,400. Digging of the new crop may help temporarily, but additional grain will be needed to prevent a pretty serious situation in Germany before another harvest. The weather hit gardens and root crops and cut down on both feed and food.

Everyone in Germany agrees that something should be done about currency reform but no one does anything about it. All workers lack incentive to produce because of the lack of confidence in money and the lack of any goods to buy. Fats and oils are very short. Soap, which is rationed, is of very poor quality. Clothing is very short.

HOLLAND— The Dutch are working hard, producing all they can and, in general, making every effort for recovery. Food is short and all possible cheese production is being exported. Cattle are numerous and in good condition, but many will have to be liquidated-- 10 to 25 per cent --due to feed shortage. Drought cut down on grains and forage, but fall rains helped potatoes and fall pastures. Dutch difficulties in Indonesia add to the expenses of the country with 200,000 out of the army of 300,000 in the East Indies.

Prevailing dairy cattle are Friesian which are black and white but somewhat more blocky and close coupled than our Holstein-Friesians (the Holsteins are red and white) and produce remarkably well on almost no grain. They are fed grass, hay and some mangels and cow beets.

The bread ration is 2,000 grams a week, recently cut from 2,200. Rationing and price controls apparently are quite well enforced in Holland, although the Dutch farmers claim that the price ceilings are too low.

The 50,000 acres of land flooded when the Germans cut the dikes along the Zuyder Zee (now Eiselmeer) in 1945 are back in production now because this was fresh water. The 225,000 acres in western Holland flooded with salt water will not be back into full production for two or three years. Progress was held up this year because dry weather made the effect of the salt even worse.

BELGIUM — Belgian agriculture, as well as the economy generally is in good shape and Belgian currency and balance between exports and imports, plus the fact that the ordinary budget is balance indicates greater stability in this little nation than in any other we visited in Europe. Food is rationed but the quantities are in fair abundance. Belgium, like Holland, depends on imports, however, for both bread and feed grains and is feeling the pinch of high wheat prices.

OTHER COUNTRIES—General-Drought has cut production of crops in Denmark, Poland and Czechoslovakia, according to reliable information although the Iowa farm group did not visit these countries. Liquidation of livestock because of short feed supplies is quite general in western Europe.

OBSERVATIONS—The farm group pretty well agreed that food supplies are dangerously low throughout most of the areas visited and that additional food must be found to make up for shortages caused by the drought. The alternative is complete governmental collapse and despair, hunger and misery that will react to the disadvantage of the western democracies -- if the visitors read the warning signs correctly.

The group generally felt, furthermore, that food can and should be used as an implement of industrial and general economic recovery rather than be shipped to Europe for continuous relief. The general objective of getting the nations themselves back on their feet and producing for themselves appealed to the Iowans.

The idea that farm and food production soon will be back on a prewar basis was pretty well dispelled by observations of the farm group.

Unless agricultural and industrial recovery can be stepped up at a much faster rate than is now the case it will be years before western Europe can begin to produce at a normal rate. Disruption of relations between western and eastern Europe is a factor delaying a return to normal.

Large quantities of grain will be needed for several seasons to tide Germany, England, France, Holland and some of the other countries over until they can re-establish prewar production and relations.

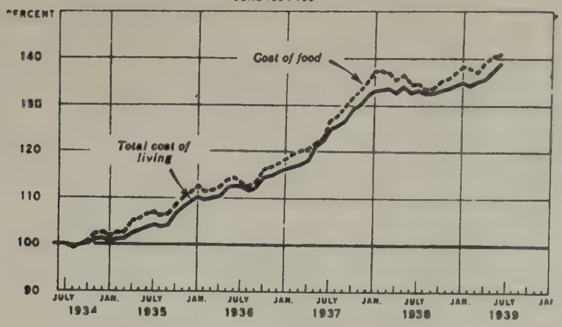
Many of these countries always have imported much of their feed and food and will continue to depend on outside sources of supply. The question of payment looms large, especially with depreciated currency and lack of production plus tariff barriers imposed by many nations including the United States--proving additional handicaps to working out ways and means of paying for needed food supplies.

But the Iowans generally agreed that the world is so small that Europe's problems actually are of some importance to us if we are to look forward to a secure and peaceful world.

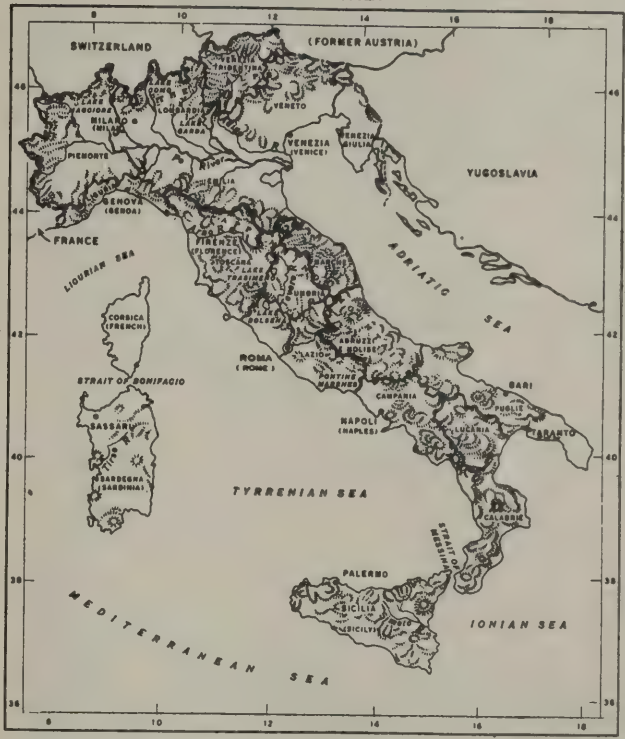
ITALIAN AGRICULTURE

INDEXES OF COST OF LIVING IN ITALY, 1934-39

JUNE 1934=100



MAP OF ITALY



Italy including the islands of Sicily and Sardinia is a little larger than the New England States and the State of New York combined - 119,764 square miles. It is one and one-fourth times the size of the United Kingdom and a little over one-half the size of France. On December 31, 1938 the population was 44,000,000 as compared with the U.S. total of 130,000,000 and the density per square mile was 368 persons, as compared with 43 in the United States.

Agriculture is the most important enterprise, engaging almost 48 per cent of the country's gainfully employed population. Italy must, however, depend on the outside world for many vital agricultural products. Returns from agriculture are divided about as follows:

	Per Cent
Cereals	25
Livestock	25
Wines	20
Fruits and Vegetables	15
Industrial & Forest Products.	15
	100

Wheat is the dominant crop. Italy ranks next to Russia and France in European wheat production. Corn and rice are next in importance among the cereal crops Among the fruit and truck crops; grapes, olives, citrus fruits, and tomatoes are most important. Cheese is a leading dairy product.

Through the Fascist Party the Government control of agriculture is one of the most rigid in the world. During the past 10 years the effort has been to increase production in an effort to achieve self-sufficiency. The primary methods employed have been to raise tariff barriers on essential imports, exclude imports of nonessentials, fix the price of most domestic farm products, and develop some of the extensive marshlands for cultivation.

The primary objective has been to increase wheat yields with the result that at a tremendous cost, yields have been increased from 16 bushels per acre to about 21 bushels in the past 15 years. This was accomplished largely by use of more fertilizer and improved varieties. Production has advanced from 198,000,000 bushels to 267,000,000 bushels, which is still well below the normal requirement of 300,000,000 bushels. This program has resulted in consumers paying 3 to 4 times the world price of wheat. The 1939-40 prices were fixed at about $2.00 per bushel compared with a 54¢ per bushel Livespool price in July 1940.

Corn, second in importance among the cereal crops, has increased in yield per acre from 28 bushels to 33 bushels. With a present production of 123,000,000 bushels about 7,000,000 bushels must still be imported.

Rice is produced in Italy in much larger quantities than in any other European country - about 70 per cent of the total production of Europe. Yields have been increased from 96 bushels per acre to 106 bushels which is more than double the United States average of 49 bushels per acre.

Wines - Italy has the world's largest acreage of vineyards with grapevines occupying about 15 per cent of the land in cultivation. It ranks second only to France in wine production, producing normally over one-fifth of the total world output. Wine accounts for about one-fifth of the agricultural income.

Olives rank fourth in acreage occupied and the production of oil is second only to that of Spain. Production does not, however, meet domestic needs.

Livestock numbers in 1937 were as follows:

	Head
Cattle & Buffaloes	- 7,286,000
Hogs	- 2,814,000
Sheep	- 9,095,000
Goats	- 1,804,000

Conversion of pasture land into wheatfields and higher costs have caused a reduction in the number of hogs (15%) and sheep (11%) since 1930. Cattle, produced chiefly for use as draft animals, increased less than 3 per cent.

Farm exports account for about 40 per cent of the value of all exports. The principal items are citrus and other fresh fruits, shelled almonds, wine and vermuth, hemp and tow, cheese, canned tomatoes and paste, raw silk, rice, and edible olive oil.

Farm imports until 1935 exceeded the value of the imports of industrial products. At the peak, 1921-1925, 64 per cent of the imports were agricultural products. The United States comes first as the source of imports followed by Argentina, Hungary, Brazil, etc. Cotton is by far the leading import making up about 8.5 per cent of the total. Wheat until the "Battle of Wheat" ranked with cotton as an import. Wool is now in second place.

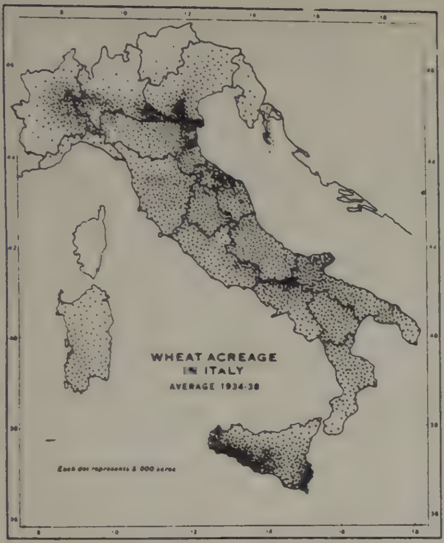
Total imports continue to exceed exports in value by over $200,000,000 (1934-38). This is a reduction in the excess by about one-third as compared with the 10 years prior to 1930.

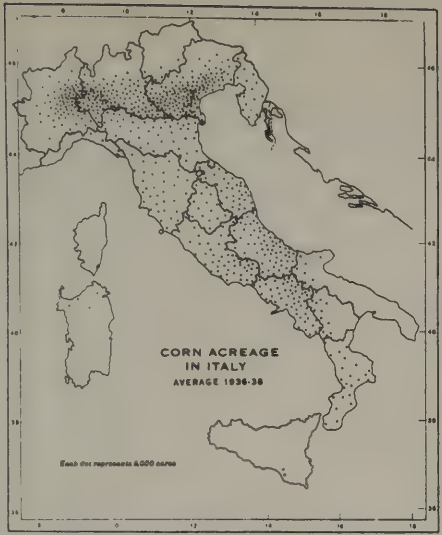
Self-Sufficiency - So far Italy has not been able to attain self-sufficiency, and progress that has been made has been through a decrease in consumption and a rise in living costs. The country is far from self-sufficient in meats, fats and oils, and cereals; and must import practically all coffee, cotton, rubber, jute, and wool. Complete agricultural self-sufficiency can be obtained only by a much further lowering of the standard of living. Whether the masses will accept this remains to be seen.

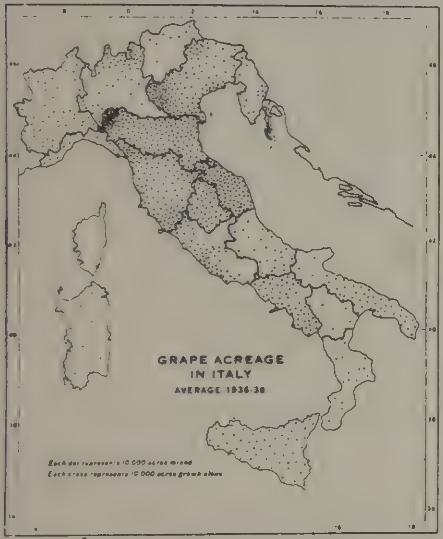
Graph and Map From U.S.D.A. - Office of Foreign Agr. Relations
Data Based on U.S.D.A.

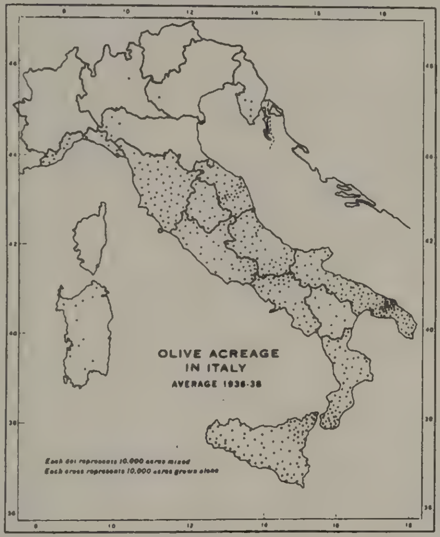
(Printed in U. S.A.)
DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

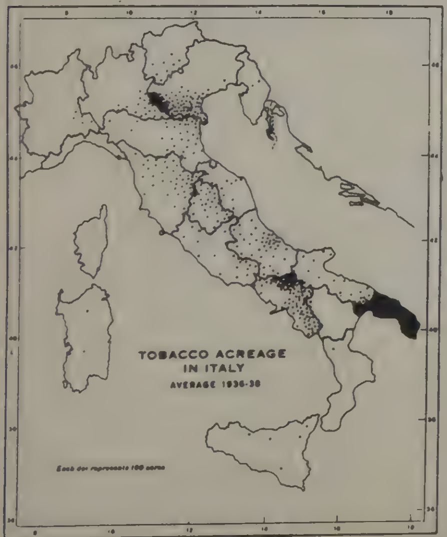
ITALIAN AGRICULTURE

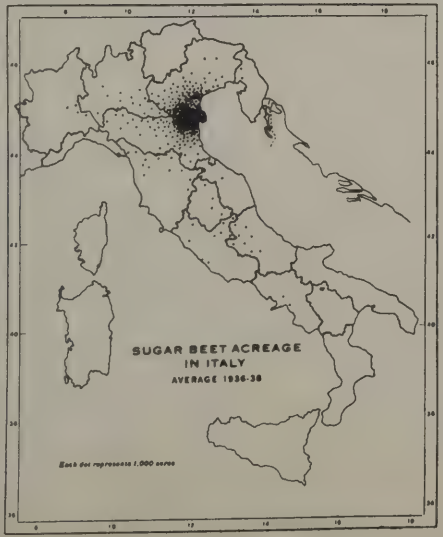





GRAPE ACREAGE
IN ITALY
AVERAGE 1936-38
Each dot represents 10,000 acres mixed
Each cross represents 10,000 acres grown alone


OLIVE ACREAGE
IN ITALY
AVERAGE 1936-38
Each dot represents 10,000 acres mixed
Each cross represents 10,000 acres grown alone





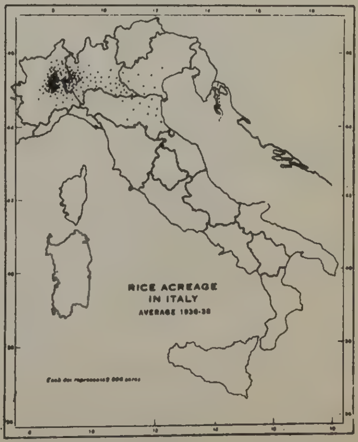
LAND UTILIZATION

1929	Per Cen
Tillable Land	41.5
Pasture	22.2
Orchards	8.4
Forests	14.8
Productive But Not Tilled	7.0
Unproductive	6.1
	100.0

CROPS - 1938	Acres	% of Tillable La
Cereals		
Wheat	12,426,000	37.7
Corn	3,724,000	11.3
Oats	1,107,000	3.4
Barley	492,000	1.5
Rice	367,000	1.1
Rye	257,000	0.8
	18,373,000	55.8
Truck Crops		
Beans, Dry	2,861,400	8.6
Potatoes	1,053,100	3.2
Others	629,400	2.0
	4,543,900	13.8
Industrial Crops		
Sugar Beets	335,600	1.0
Hemp	224,600	0.7
Flax	43,700	0.1
Cotton	90,700	0.3
Tobacco	81,500	0.2
	776,100	2.3
Planted Meadows and Annual Grass Crops	9,250,400	28.1
	32,943,400	100.0

OWNERSHIP AND TENANCY - 1930

	% of Acreage	% of No.
Occupying Owners	57.5	59.1
Cash Tenants	12.7	13.5
Sharecroppers	15.8	12.6
Mixed	14.0	14.8
	100.0	100.0
SIZE OF FARM		
Acres		
Up to 2.5	2.5	35.5
2.6 - 12.5	17.1	43.0



Maps and Data From U.S.D.A. - Office of Foreign Agr. Relations

EUROPE'S BREAD BASKET

The countries of the lower Danube Basin - Rumania, Hungary, Yugoslavia, and Bulgaria - have long been the principal European producers of staple agricultural surpluses. The strategic importance of this area has been greatly increased by the present war.

Europe, excluding the Danube Basin and Russia, imports 20 per cent of its total feed requirements and 14 per cent of its apparent bread grains. Western Europe, however, imports over half of its bread grain and nearly half of its feed grain. Of these total requirements the Danube Basin supplies 37 per cent of the wheat, 17 per cent of the rye, 19 per cent of the corn, 3 per cent of the oats, 23 per cent of the barley, 1 per cent of the oil cake, and 4 per cent of the edible fats. (See table below) Total Russian exports just before the war were only about one-half of the Danubian surplus (see table on page 1070) so that even if all surplus producing agricultural areas of Europe were brought under German domination there would still be a serious food and feed deficit assuming normal peace-time requirements and an effective British blockade.

Rumania and Hungary are the chief agricultural areas in the Danube Basin. The population of Rumania is about 20 million of which 80 per cent are engaged in agriculture. About 40 per cent of the crop acres are composed of small holdings averaging less than 25 acres each, but 38 per cent of the area is held in estates of more than 1250 acres. The absence of middle sized farms is very evident and the extremes of small and large farms result in inefficient methods and low yields. Because of these hindrances, plus the restriction of a wartime economy, and the illiteracy of the peasant classes, it does not seem likely that Rumanian production can be increased within the next few years.

Hungary following the first World War was reduced to a small country of 8 million people. Because of restricted outlets for agricultural products in the post-war period the country became more industrialized and turned to more livestock. Forty-three per cent of the land is held in large estates averaging 5,613 acres and farms exceeding 280 acres in size. Eighty-five per cent of all farms average less than 14 acres in size and fully 40 per cent of the farm population is without any land. In spite of all this, Hungarian agriculture is more advanced than that of the other Danubian countries. Still there seems little possibility of immediately increasing the export surplus. Any surplus produced will depend principally on the condition of the crop and the ability to plant and harvest grain under wartime conditions.

Yugoslavia is predominantly an agricultural country but less than 1/5 of the total land area is suited to intensive farming. About 4/5 of the total population is engaged in agriculture. Large holdings account for 45 per cent of the agricultural land but 90 per cent of the farm population lives on farms averaging about 8 acres in size of which only 5 acres are arable. Livestock account for nearly 1/4 of the agricultural income. The structure of Yugoslavian farm economy will not readily change and exportable surpluses will depend largely on weather conditions, and the extent to which the peasant classes are deprived of essential foods.

The principal agricultural problems in Bulgaria arise from her many small farms and the pressure of increasing farm population. The weight of this increasing farm population is indicated by the estimate of 5.8 farm workers per 25 acres of land in Bulgaria as against 4.1 in Rumania, 4.0 in Yugoslavia, and 2.8 in Hungary. Most of the land is held in small farms. As a result of subdivision through inheritance and community legislation these small farms averaging 12.5 acres consist of 15 different strips of land, often widely separated. Because of the large farm population and the small holdings it will be impossible for Bulgaria to greatly increase her exports even if normal crop seasons prevail and there is no adverse effect from the war.

AVERAGE PRE-WAR NET EXPORTS OF THE DANUBIAN BASIN AND AVERAGE PRE-WAR NET IMPORTS OF BLOCKADED CONTINENTAL EUROPE

COUNTRY	Bread Grains		Feed Grains			Total Bread & Feed Grains	Oilseeds & Oilcake	Dry Beans	Eggs	Butter
	Wheat and Flour	Rye	Corn	Oats	Barley					
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Danubian Net Exports**										
Rumania	850,000	77,000	591,000	11,000	285,000	1,814,000	94,000	47,000	11,000	0
Hungary	677,000	55,000	- 25,000	2,000	8,000	717,000	- 5,000	18,000	11,000	4,000
Yugoslavia	220,000	3,000	389,000	4,000	4,000	620,000	5,000	32,000	13,000	0
Bulgaria	142,000	6,000	58,000	1,000	9,000	216,000	11,000	19,000	18,000	0
Total Danube Basin	1,889,000	141,000	1,013,000	18,000	306,000	3,367,000	105,000	116,000	53,000	4,000
Continental European Net Imports (1935-38)										
Germany	746,000	130,000	1,242,000	122,000	252,000	2,492,000	1,951,000	29,000	88,000	89,000
Austria	130,000	126,000	371,000	29,000	53,000	709,000	39,000	2,000	6,000	3,000
Czechoslovakia	118,000	59,000	93,000	25,000	49,000	196,000	165,000	4,000	9,000	0
Denmark	263,000	176,000	402,000	28,000	69,000	800,000	926,000	0	95,000	164,000
Norway	239,000	146,000	153,000	2,000	18,000	558,000	50,000	7,000	1,000	0
Belgium	1,132,000	134,000	866,000	46,000	460,000	2,638,000	242,000	8,000	11,000	3,000
Netherlands	675,000	19,000	1,012,000	18,000	255,000	1,979,000	645,000	3,000	80,000	58,000
France	149,000	1,000	770,000	46,000	195,000	1,161,000	1,113,000	25,000	13,000	4,000
Italy	608,000	15,000	166,000	87,000	52,000	928,000	121,000	36,000	5,000	0
Switzerland	507,000	20,000	107,000	216,000	145,000	995,000	28,000	2,000	15,000	1,000
Greece	507,000	0	62,000	2,000	12,000	583,000	11,000	20,000	1,000	0
Total Imports	5,074,000	826,000	5,244,000	571,000	1,324,000	13,039,000	5,269,000	136,000	28,000	136,000
Percentage of Total Deficit European Imports	37.2%	17.1%	19.3%	3.1%	23.1%	53.1%	89.1%	-	-	1.2%

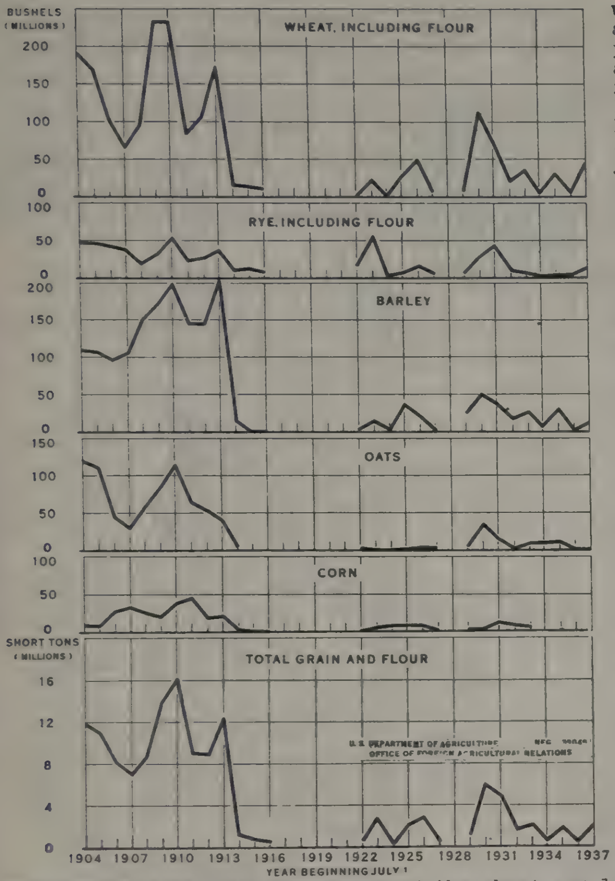
*Net imports and net exports of oilseeds and oilcake are averages for the 5 years 1933-37. Oilseeds are in terms of oil equivalent.

**1935-39 average for bread and feed grains; 1935-38 average for dry beans, butter, and eggs.

U.S.D.A., "Foreign Agriculture", Frederick Strauss

SOVIET RUSSIA'S FOOD SURPLUS

EXPORTS OF GRAINS FROM THE SOVIET UNION, 1904-37



Before the World War Russia was the granary of western Europe but following the defeat of the Russian armies in 1914 and the revolution which followed, exports fell almost to the vanishing point. In 1923 and again in 1925 and 1926 small exports occurred. In 1930 following a bumper crop exports jumped to the highest level in any year of the post-war period. Since then, however, exports have dropped and the total exports of all grain and flour has fallen to an annual average of 2 to 3 million short tons as compared to a pre-war level of about 11 to 12 million short tons and a high of more than 16 million short tons in 1910. (See graph and table at bottom of page.)

The reduction in Russia's grain exports does not seem to lie in the inability of the Soviet to produce agriculturally because average yields per acre are higher than before 1914. Russian statistics although admittedly constructed to show a favorable picture claim a gain of 23 per cent in yields in the past twenty years. Actually the increase probably has not been more than 5 to 7 per cent. During this period crop acreage has remained fairly constant.

The explanation seems rather to lie in increased domestic demand. The population within the boundaries of the Soviet Union has increased 23 per cent from 138.2 million in 1914 to 170.5 million in 1939. Urban population in the same period increased from 24.7 million to 55.9 million, or more than doubled. "Although various factors of domestic and international character have contributed to the decline of Russian grain exports, the lag of production behind the growth of population, especially of urban industrial population - for the feeding of which the government is responsible - must be considered the most formidable obstacle, overshadowing all other. This was especially true during poor crop seasons that frequently occur in the extensive semiarid zone of the Soviet Union, which comprises the bulk of its surplus producing area."

Significant changes occurred in the outlets for Russian wheat during the post-war period. Before 1914 Germany and Italy each took about 29 per cent of Russian total exportable surplus of wheat. Germany alone took four-fifths of Russian barley exports. England in the same period took only 9 per cent of the wheat and less than 10 per cent of the barley. In the period 1933 to 1935 the picture was reversed. England took half or more of Russian wheat and barley exports and German imports of Russian wheat decreased to very low levels.

The fact remains, however, that while Russian exports no longer equal the volume of the pre-war period she is still one of the two surplus-producing areas from which grain supplies can continue to flow into blockaded contintental Europe. (The Danubian Basin is the other.)

Through conquest Germany gained control of the Danubian Basin early in 1941. She is now waging war on Russia in an attempt to gain control of the Russian Ukraine and if successful will control all surplus producing agricultural areas of continental Europe. Prior to the outbreak of the present war German imports of food and feed were approximately 2½ million tons or just about equal to Russia's exportable surplus.

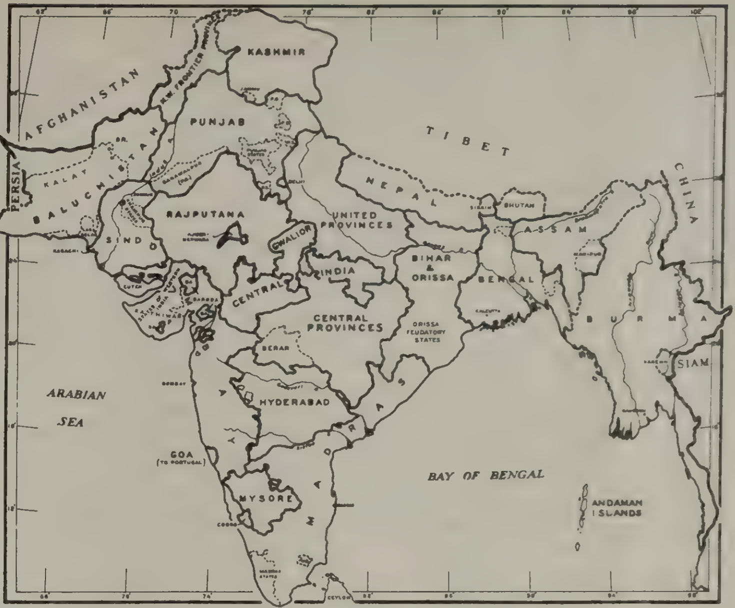
EXPORTS FROM THE SOVIET UNION OF SPECIFIED GRAINS AND FLOUR, 1904-05 to 1937-38

July 1 to June 30	Wheat Including Flour	Rye Including Flour	Barley	Oats	Corn	Total Grain and Flour
Average	Bushels	Bushels	Bushels	Bushels	Bushels	Short Tons
1904-05 to 1908-09	125,300,000	38,700,000	114,600,000	72,700,000	20,300,000	9,323,000
1909-10 to 1913-14	165,700,000	34,500,000	172,900,000	70,800,000	28,400,000	12,013,000
1924-25 to 1928-29	16,300,000	6,500,000	12,300,000	1,700,000	4,700,000	1,126,000
1929-30 to 1933-34	49,100,000	19,000,000	30,800,000	12,600,000	5,700,000	3,104,000
1934-35 to 1937-38	20,400,000	5,200,000	12,100,000	5,000,000	*	1,135,000
Percentage Of Total						
1934-35 to 1937-38	53.9%	12.8%	25.6%	7.0%	0.7%	100.0%

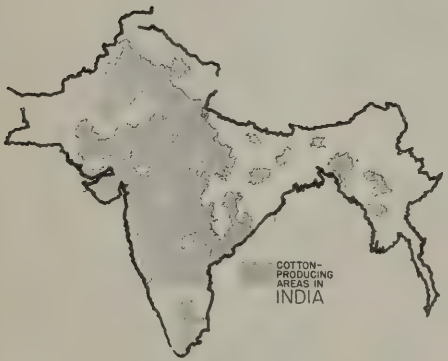
*Less than 100,000 bushels.

U.S.D.A.,"Foreign Agriculture",Lazar Volin

AGRICULTURE OF INDIA



India: British Provinces and Indian States.

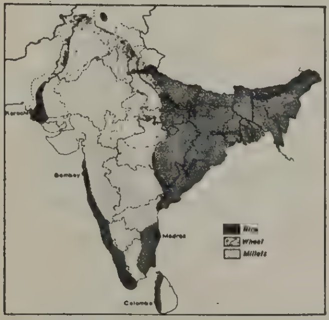


The great sub-continent of India is one of the most important agricultural regions in the world. In spite of this, the people live in a constant state of semi-starvation.

Population and population growth in India, including Burma, 1600-1941

YEAR	POPULATION	INCREASE DUE TO-		RATE OF POPULATION GROWTH IN SUCCESSIVE INTERCENSAL PERIODS
		INCLUSION OF NEW AREAS	POPULATION GROWTH	
	Millions	*Millions*	*Millions*	*Percent*
1600	100	-	-	-
1750	130	-	-	-
1850	150	-	-	-
1872	206	-	-	-
1881	254	34	14	6.8
1891	287	5	28	11.0
1901	294	3	4	1.4
1911	315	2	19	6.4
1921	319	-	4	1.2
1931	353	-	34	10.6
1941	406	-	53	15.0

1600-1931 from Mukerjee *(8, p. 3)*: 1941, official Indian census for 1941, 389 millions, and estimate for Burma, 17 millions.



Cultivation of principal food grains in India and Ceylon. (Reproduced from V. D. Wickizer and M. K. Bennett, The Rice Economy of Monsoon Asia, Food Research Institute, Grain Economics Series No. 3.)

The total area of India is approximately 1,575,000 square miles, an area slightly more than one-half that of the United States. Agricultural methods are primitive and cannot utilize much of the semi-arid regions so that less than one-third or only 320,000,000 acres are actually in crops. This compares with a total crop land area of 342,000,000 acres in the United States. Yet this limited area supports a population estimated at 400,000,000 people, three times that of the United States. In the southwestern part of Dacca Province and adjoining areas, "the population is in no area less than 1,000 to the square mile and reaches as much as 3,275." Total population has increased one-fourth or 25% since 1895.

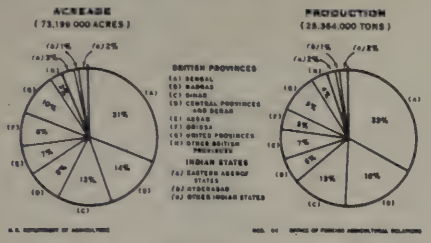
The principal problem of India's agriculture is providing food for so many people. Five acres is normally considered a minimum subsistence farming unit for the typical farm family, yet almost one-fourth of all farms are less than one acre in size. Even this small holding may be split, because of the inheritance system, into a dozen or more very small tracts scattered over a large area. Much tillable acreage is lost along field margins and boundaries.

Based on U.S.D.A. Data

DOANE AGRICULTURAL SERVICE, INC., St. Louis 12, Mo.

AGRICULTURE OF INDIA

India has the world's largest acreage of rice and is second only to China in total production.



Rice acreage and production in India, 1940.

Nearly one-fourth of the tillable land area is in rice and the diet of approximately 70 per cent of the people consists mostly of rice. The acreage of rice was almost doubled between 1895 and 1920. Since then the increase in acreage has been only about five per cent. Average yields have been declining and total production has actually dropped four per cent. Average yield is now only 26 bushels per acre as compared to 75 bushels in Japan and 49 bushels in the United States. Large imports have always been drawn from Burma, but these have not been sufficient to keep pace with the increasing population and per capita consumption has declined more than forty pounds per person since 1920.

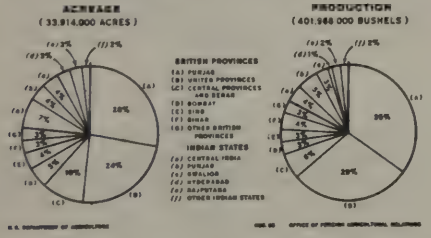
TABLE 4.–*Rice production, trade, and utilization in India, 1916-20 to 1936-40*

PERIOD	PRODUCTION	IMPORTS	EXPORTS	AVAILABLE SUPPLIES	POPULATION	PER CAPITA UTILIZATION
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Millions*	*Pounds*
1916-20	61,233	2,646	750	63,129	308	205.0
1921-25	57,864	1,962	639	59,187	311	190.3
1926-30	56,133	2,425	683	57,875	329	175.9
1931-35	58,869	3,263	573	61,559	346	177.9
1936-40	56,025	3,814	727	59,112	364	162.4

Compiled from Estimates of Area and Yield of Principal Crops in India 1939-40 *(5)*; and Wickizer and Bennett *(14, p. 328)*.

Millet, of which three common species are grown, constitute the second most important food grain. Roughly, one-fifth of the total crop acreage is in millet. Millet is the poor man's food as it requires less irrigation and will grown on poorer soils than either rice or wheat. Total production is declining under the present system of farming.

Wheat is the third most important crop grown and occupies approximately one tenth of the crop land annually. India is unique in that nearly two-fifths of the wheat grown is produced under irrigation. Before the first World War, India had an exportable surplus of wheat, but since then she has been a net importer. As with rice and millet, the possibilities of increasing the wheat acreage are limited.



Wheat acreage and production in India, 1940.

Gram* is the fourth most important food crop. Smaller acreages of corn and barley are also grown. As with the major crops, production in most instances is on a declining scale. In fact, under present agricultural methods the possibility of increasing production, either through increased acreages or increased yields, is very limited. The people are handicapped by habit and religious tradition. For example, it is believed that crops grow best if planted all together in the same field; thus, corn and other crops may be grown in mixed stands and receive exactly the same tillage practices.

Oil and oil-seed are not produced for food and enter largely into export trade as the second most important non-food crop.

CROPS GROWN IN INDIA

CROP	ACREAGE	PER CENT OF CROP LAND
Rice	73,000,000	23
Millet	61,000,000	19
Wheat	33,000,000	10
Gram*	21,000,000	6½
Other Food Grains and Legumes	49,000,000	15
TOTAL GRAINS	237,000,000	74
Fruits & Vegetables	5,000,000	1½
Sugar	5,000,000	1½
Other foods & spices	5,000,000	1½
TOTAL ALL FOODS	252,000,000	79
Oil Seeds	23,000,000	7
Cotton & other fibers	25,000,000	8
Fodder Crops	14,000,000	4
All others	6,000,000	2
TOTAL CROPS OTHER THAN FOOD	68,000,000	21
TOTAL ALL CROPS	320,000,000	100

Cotton is the principal non-food crop. India ranks second only to the United States as a producer of the fiber. As in the case of food crops, production has not changed much. In the last 35 years, total production has varied from 2,700,000 to 5,300,000 bales and has exceeded 5,000,000 bales only three times in this period.

Livestock production for food is almost unknown. There are large numbers of water buffalo used as beasts of burden, but "to kill a bullock or a cow is a deadly sin in Hinduism". Thus, except among the few Christians and the Mohammedans (about one-fourth of the total population), meat does not enter into the average diet of the people. It has been estimated that the average annual consumption of meat is between three and eight pounds per capita. It is probable that large areas of India not suited to crop production could be utilized for livestock range, but the religious life of these simple, illiterate people is hard to change, and one of India's greatest agricultural resources goes almost untouched so that no appreciable increase in food production can be expected from this source.

Obviously, the diet of India's vast population is deficient, both in quantity and in quality. Fully 98 per cent of the food consumed is of vegetable origin and 78 per cent or almost four-fifths is composed of food grains. Such a diet is certain to be deficient in proteins, minerals and vitamins. Any population so dependent on the total food production of the land is subject to sudden and extreme famine when crop failures occur. In the western world, including Europe, large total dependence is placed in livestock as food. This serves to cushion the shock of crop failures since the livestock can be slaughtered when crops fail and, in addition, feed grains which normally go in livestock production are temporarily diverted to human consumption.

India has great industrial possibilities, not least of which is her great untapped resources of manpower. India is now the world's leading producer of mica. She is second only to Russia in the production of manganese. In addition, India has iron-ore deposits estimated at 3,000,000,000 tons, and coal estimated at 36,000,000,000 to 60,000,000,000 tons, of which 5,000,000,000 tons are readily available. There are also large deposits of bauxite and potential sources of hydro electric power for producing aluminum. India is one of the principal producers of chromite.

Industrialization of India has proceeded at a slow rate and only the textile industry has been developed to any large extent on a self-sustaining basis. The average consumption of cotton cloth is only about four pounds per person per year.

In conclusion, it is apparent that the population of India is approaching a peak under the prevailing agricultural system which, in most cases, is bound by religious superstition and habit to methods of the centuries past. India has vast industrial resources but these have not been developed and cannot now be drawn on to relieve suffering and want.

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*Gram - In India especially, one of certain leguminous plants grown for their seed; as chick-pea. (Webster)

Based on U.S.D.A. Data

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* Potatoes For Profit, November 1951, may also be numbered 156-157.
** Doane Sheep System, July 1951, may also be numbered 232-233.

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The Digest page numbering system is worked out on an expansible basis so that new pages can be put in anywhere -- because of this, page numbers do not run consecutively.

But, it is easy to keep your Digest up-to-date and in order if you file the releases as they come to you. It takes only a minute if you follow these simple rules --

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3. Pink Pages -- These are of current interest only. There are three groups:
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